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A MONOGRAPH OF THE GENUS MIMULUS[1,2]

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INTRODUCTION

An attempt to determine specimens of the genus *Mimulus* found growing in California revealed the fact that serious difficulties were to be encountered because of the scattered literature, the close relationship existing between many of the species, and the extreme polymorphism of others. In view of this, the writer decided to undertake a critical examination of the group. At first a study of only those species growing in California was contemplated, but as the work progressed and the various segregates were considered it was deemed best to make a revision of the entire genus.

This investigation was continued through a period of six years. During this time various herbaria were visited where type collections and numerous specimens were carefully studied. In addition to the large number of specimens available for critical examination at the Missouri Botanical Garden, where the major part of this work was done, material was borrowed extensively from many herbaria. For the privilege of studying these col-

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[1] An investigation carried out at the Missouri Botanical Garden in the Graduate Laboratory of the Henry Shaw School of Botany of Washington University, and submitted as a thesis in partial fulfillment of the requirements for the degree of doctor of philosophy in the Henry Shaw School of Botany of Washington University.

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In addition to the study of herbarium specimens, some experimental work was done. Seeds of a number of species were grown under varying conditions in the gardens and greenhouses at the University of California, Stanford University, Missouri Botanical Garden, and Cornell University. Extensive field studies were also carried on in various parts of California, especially in connection with the polymorphic groups.

HISTORY OF THE GENUS

The genus *Mimulus* was first described by Linnaeus[1] in 'Acta Upsaliensis' in 1741. This was followed by another description and by an illustration in 'Hortus Upsaliensis,'[1] the diagnosis in each case being based on material collected in Virginia. In the first edition of Linnaeus' 'Species Plantarum,'[2] published in 1753, *M. ringens* is the only species mentioned, making it, without doubt, the type species of the genus. A full description of *Mimulus* was given in the 'Genera Plantarum,'[3] which appeared a year later. In the second edition of the 'Species Plantarum,'[4] published in 1763, the description of *M. luteus* was added, this being founded on material collected in Chile by Feuillee[5] in 1710. Within a few years, *M. aurantiacus,*[6] *M. glutinosus,*[7] and *M. alatus*[8] were described, so that in Willdenow's 'Species Plantarum,'[9] published in 1800, four species were recognized, and one, *M. aurantiacus*, was given as a synonym of *M. glutinosus*. In 1810, Robert Brown[10] published the description of a new genus which he called *Uvedalia* and to this he referred a single species, *U. linearis*, a native of Australia. This generic name, however, was soon reduced to synonymy. Several new species of *Mimulus* were subsequently recorded from time to time, but the first comprehensive treatment of the genus was made by Bentham[11] in his paper on the *Scrophulariaceae* of India. Twenty-five species were recognized, ten of which were described for the first time.

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[1] Linnaeus, C., Acta Ups. 82. 1741.

The first segregate of *Mimulus* was made by Nuttall[12] when he published the genus *Diplacus*, basing his segregation mostly on the shrubby habit and on the separation of the placentae. Four species were described as new and *M. glutinosus* Wendl. was transferred to the new genus.

Spach,[13] in 1840, proposed the second segregate, *Erythranthe,* founded on a single species, *M. cardinalis* Dougl. This generic name soon accompanied *Uvedalia* into synonymy.

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[1] Linnaeus, C, Hort. Ups. 1: 176, *pl. 1.* 1748.

[2] *Ibid.*, Sp. Pl. 2: 634. 1753.

[3] *Ibid.*, Gen. Pl. ed. 5, 283. 1754.

[4] *Ibid.*, Sp. Pl. ed. 2, 2: 884. 1763.

[5] Feuillee, L., Jour. 2: 745–746. 1714.

[6] Curtis, W., in Bot. Mag. *pl. 354.* 1796.

[7] Wendland, J. C., Bot. Beobacht. 51. 1798.

[8] Aiton, W., Hort. Kew. 2: 361. 1789.

[9] Willdenow, C., L. Sp. Pl. 3: 360–362. 1800.

[10] Brown, R., Prodr. 440. 1810.

[11] Bentham, G., Scroph. Ind. 27–29. 1835.

[12] Nuttall, T., in Taylor's Ann. Nat. Hist. I, 1: 137–139. 1838.

[13] Spach, E., Hist. Nat. Veg. Phan. 9: 312. 1840.

Bentham[1] continued his studies on the *Scrophulariaceae* and in De Candolle's 'Prodromus,' he recognized Nuttall's genus *Diplacus* and described another one which he called *Eunanus*. In all, thirty-one species were listed under *Mimulus*, four under *Diplacus*, and three under *Eunanus*, making a total of thirty-eight, eleven of which received definition for the first time.

Asa Gray[2] was the next botanist to present a systematic treatment of this genus, and in 1876 he published a synopsis of all the North American species then known. In this paper, *Diplacus* and *Eunanus* were reduced to sections, Dr. Gray believing that the intermediate forms made them invalid as genera. Twenty-nine species were included, all being grouped under four sections, *Eunanus*, *Diplacus*, *Eumimulus*, and *Mimuloides*. Bentham and Hooker[3] in the 'Genera Plantarum' followed this same treatment, and Gray,[4] later in the same year, added one more section which he called *Œnoe*.

Greene,[5] in 1885, restored *Diplacus* and *Eunanus* to generic rank, but in the following year, Dr. Gray[6] again revised the group and again reduced the segregates, saying "Polymorphus, but better retained entire under five subgenera than divided into as many genera." The same year, Greene[7] described the last segregate to be made in the genus, making *M. pilosus* (Benth.) Wats. the type species of a genus which he designated as *Mimetanthe*. The last article to be published on the group was a revision of the genus *Diplacus* by Greene,[8] who again maintained its right to generic position.

All of the most recent workers on the western flora, except Howell and Rydberg, recognize *Diplacus* and *Mimetanthe* but not *Eunanus* as valid genera. Rydberg,[9] in his 'Flora of the Rocky

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[1] Bentham, G., in DC. Prodr. **10**: 368–374. 1846.

[2] Gray, A., in Proc. Am. Acad. **11**: 95–99. 1876.

[3] Bentham & Hooker, Gen. Pl. **2**: 946–947. 1876.

[4] Gray, A., in Bot. Calif. **1**: 562–569. 1876.

[5] Greene, E. L., in Bull. Calif. Acad. Sci. **1**: 94–123. 1885.

[6] Gray, A., Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 442–451. 1886.

[7] Greene, E. L., in Bull. Calif. Acad. Sci. **1**: 181. 1886.

[8] *Ibid.*, Pittonia **2**: 151–157. 1890.

[9] Rydberg, P. A., Fl. Rocky Mountains, 777–780. 1917.

Mountains,' lists three species under *Eunanus* but the *Mimetanthe pilosa* of Greene, he places under *Mimulus* as *M. pilosus*. Wettstein[1] considers that of all the segregates, only *Mimetanthe* is entitled to generic rank and he places it in a different group.

GENERAL MORPHOLOGY

Roots.—The root system in the genus *Mimulus* is not extensive, even in the shrubby forms. The majority of the species are annuals and have a simple annual root; this usually consisting of a short tap root with a few lateral ones or occasionally all of the roots are lateral. Many of the species are perennial by rooting from the nodes, and if any of the stem touches the ground roots will develop at all the joints in contact with the moist earth. Whether plants of this type are truly perennial is doubtful; in protected places they may survive the mild winters in some parts of the world, but if in an exposed position, plants of the same species are typical annuals.

Stems.—The stems vary greatly in the several groups from the dwarf subacaulescent members of *Œnoe* to those in *Diplacus* which are woody and from six to eighteen decimeters high. The majority of the perennials die down during the winter, coming up each spring so that the parts above ground are mainly annual. The stems sometimes are simple but more commonly they are more or less branched. The main axes and branches may be terete or quadrangular, terete stems being the more common. *M. ringens* and *M. alatus* have square stems, those of *M. alatus* being winged. The probable derivation of *M. alatus* from *M. ringens* is indicated by the fact that in the latter we occasionally find stems which are partly winged. In the section *Simiolus* the majority of the species have quadrangular stems, these oftentimes being hollow.

Underground stems are common in the perennial species. Most of the members of the sections *Eumimulus*, *Erythranthe*, and many of those in *Paradanthus* have horizontal stoloniferous rootstocks growing not far below the surface. A few species, such as *M. moschatus* and *M. Tilingi*, have moniliform rootstocks. *M. jungermannioides* and *M. primuloides* commonly propagate themselves by scaly bulblets which appear on the underground stems toward the end of the growing season. *M. Eastwoodiae* and *M. primuloides* produce runners above ground. A few species found in Mexico and in Australia are characteristically repent.

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[1] Wettstein, R., in Engler & Prantl, Nat. Pflanzenfam. 4^{3b}: 77. 1891.

The annual species are rarely more than three to six decimeters high as in *M. brevipes* and *M. Bolanderi.* The section *Œnoe* is peculiar in that many of the species are nearly stemless, the flowers being produced in the axils of crowded basal leaves.

Leaves.—As is the case in most polymorphic genera, *Mimulus* shows great differences in shape, texture, and size of the leaves. Throughout this genus simple leaves with little or no lobing are common. *M. laciniatus* is the only species with typically lobed or parted leaves, yet in a few of the other members of the section *Simiolus* there are small lobes at the base of the leaf-blade. The shape of the leaves within a single species in this section may vary to such an extent that descriptions of several species and a number of varieties have been wrongly based on leaf characters alone. Occasionally the leaves are mainly basal, this condition being found in *M. primuloides* and in some of the polymorphic species belonging to the section *Simiolus* as well as to *Œnoe.* The venation varies from typically feather-veined to a condition where several main veins arise from the base of the blade. The latter condition, being less common and found mostly in the more highly specialized groups, is regarded as of later derivation.

Pubescence.—There is great diversity in the kind of hairiness within the genus, viscid- or glandular-pubescence being the common type. Members of the section *Eumimulus* and many of the South American *Simioli* are typically glabrous. The single species in *Tropanthus* is glabrous but the surface is covered with sessile glands. *Diplacus* is the only group in which branched hairs have been commonly found. A few species in the section *Paradanthus* have hairs which secrete a slimy sticky substance, this latter seeming to be a late development. Most of the annuals in *Paradanthus, Eunanus,* and *Œnoe* are glandular or viscid-pubescent, and as they usually are found in dry and semi-arid places the amount of hairiness may be due to the effect of their environment.

Inflorescence.—In the majority of cases the flowers are solitary in the axils of the leaves, those in several species beginning at or near the base of the plant. In *Eumimulus* and *Simiolus* the inflorescence is usually racemose; the form of the inflorescence is of little or no value, however, in the recognition of sections in *Mimulus*. The length of the pedicels has been used by several taxonomists as a character of definite importance in separating some of the segregates of the genus, notably *Eunanus*. The relative length of the pedicel and calyx holds within the subgenus *Schizoplacus* but varies considerably within the sections in *Synplacus*. Here the pedicel may be either shorter or longer than the calyx, thus making such a character useful only in minor categories. The amount of curvature of the pedicels is helpful in specific diagnosis alone.

Calyx.—The persistent, 5-angled, more or less plicate calyx is one of the most constant characters within the genus and the most satisfactory to use in separating *Mimulus* from its nearest relatives. In a few species, such as *M. Rattani, decurtatus,* and *exiguus,* the angles are weak and the calyx almost sulcate. This would indicate close relationship to *Mimetanthe,* the only segregate of *Mimulus* which is recognized in this monograph. The calyx-teeth are conduplicate in the bud. In anthesis, they vary from almost obsolete, as in *M. Grayi,* to those from one-half to one-third the length of the tube, as in several species of *Eunanus* and *Paradanthus.* The inflated calyx common to the members of the section *Simiolus* and to some of the species in *Paradanthus* is considered to be an advanced condition.

Corolla.—The shape of the corolla shows great diversity within the genus but in general it can be relied on for broad sectional characterization. The most primitive type is probably that which we find in some of the species in the sections *Paradanthus* and *Eunanus.* Here the corolla is funnelform with an open throat and has equal or nearly equal lobes. The bilabiate and personate corollas found in the other groups are probably derived from some such condition. The tube may be included or it may be from two to four times as long as the calyx, the latter condition assuredly indicating specialization. The throat usually is exserted and may be funnelform or cylindrical. The lobes vary greatly in shape, contour, and length, the lower lip generally being longer than the upper. There is no external evidence of nectar glands near the base of the corolla. With the exception of a few species in the sections *Eunanus* and *Diplacus*, the corolla drops off rather early, this being the chief reason for the loss in popularity of *Mimulus* as a garden flower in European countries.

The color of the corolla does not offer any satisfactory evidence as to the probable ancestry of the sections. Blue, usually considered to be the latest color to develop, is confined to *Eumimulus* and to a small group of Australian species which have been arbitrarily placed in the section *Paradanthus*. Yellow, which is supposed to be primitive, is found in all of the species in the specialized section *Simiolus* and in many of the species in *Diplacus*, *Eunanus*, and *Paradanthus*. Reddish-purple is common in *Eunanus* and *Paradanthus* and is dominant in *Œnoe*. Varying shades of scarlet appear in *Erythranthe* and the orange of many of the species of *Diplacus* becomes a deep-red in some of the members of that group. Albino forms and other color modifications are occasionally encountered and these are considered under the species where they occur. The writer feels that where color is the only factor separating two forms greater clearness is attained by making the specific diagnosis broad enough to include these anomalous conditions rather than by using special names to designate such forms.

Stamens.—The stamens are in two unequal pairs, usually equally inserted in the tube and included. The filaments are chiefly glabrous but in some species they are puberulent or pubescent. The anthers are two-celled, the cells being confluent at the apex in most of the groups but coherent for nearly half their length along the back in *Simiolus* and some of the species in *Paradanthus*. In *Simiolus* and *Eumimulus* the anthers are often connivent in the younger flowers, separating after dehiscence. A number of species have more or less hairy anthers. In *Schizoplacus* the anthers are usually brought close together, forming pairs which sometimes simulate a Greek cross.

Pistil.—The structure of the pistil conforms to that of other members of the *Scrophulariaceae* in being bicarpellary and in having a 2-celled ovary with axial placentation. The style is usually included and may be glabrous, puberulent, or glandular-pubescent. The stigma varies from bilamellate with equal or unequal lips to peltate-funnelform. In the species with equal lips the whole inner surface is stigmatic, whereas in the other type a stigmatic condition is usually found only on the longer lip. Although in most cases the stigma is slightly above the uppermost pair of stamens, thereby facilitating cross-pollination by insects, often it is on the same level. Under the latter condition the stigma is usually self-pollinated. Self-pollination frequently happens even in normal flowers because the pollen matures at the same time as the stigma and the two are close enough together so that a slight swaying of the flower may scatter the pollen sufficiently to cause some to fall on the receptive stigma. The stigma-lips are very sensitive and close quickly when a mechanical stimulus is applied or when pollen falls on them.

Capsule.—The capsule presents much diversity of form and texture. It may be coriaceous, cartilaginous, membranaceous, or chartaceous. With the possible exception of one or two species in *Œnoe*, it is loculicidally dehiscent, opening in one of the following ways: (1) along both sutures to the base, (2) along the inner suture and only part way down the outer, (3) tardily dehiscent along the inner suture, occasionally breaking away at the base. The inclusion or exsertion of the capsule is of value only for specific definition.

The type of placentation is important, and serves as an excellent basis for separating the genus into two main groups. When the fruit matures the placentae may separate to the base, the two halves remaining adherent to the valves or they may be coherent nearly or quite to the apex, forming a firmly united central column. In *M. rubellus, Suksdorfii, deflexus*, and *montioides* there is a somewhat intermediate condition in which the placentae separate almost to the middle. The divided type of placentation seems to be more common in *Scrophulariaceae*; therefore it is here considered to be the more primitive.

Seeds.—The seeds in *Mimulus* offer little value even in the delimitation of species. They are exceedingly numerous and are usually oval or oblong with a smooth or reticulate surface. In several closely related species in *Œnoe* they are covered with curious anchor-shaped hairs.

DISCUSSION OF THE SECTIONS

In the preparation of this monograph more than seven thousand specimens of *Mimulus* have been carefully examined. As a result of this study the writer has been led to believe that the genus is most satisfactorily treated by dividing it into two subgenera with several sections under each. The species which Dr. Gray and many other systematists regarded as *Mimulus* proper or *Eumimulus* have been divided among four sections, based primarily on differences in the calyx and corolla. The members of these sections agree in having the placentae united firmly, forming a central column or separating only at the apex, rarely parting as far as the center. These sections form a subgenus, *Synplacus.* The other sections, in which the placentae divide to the base, form the second subgenus, *Schizoplacus.* Through *M. rubellus* and some of its close relatives the two subgenera intergrade, the placentae separating nearly half way to the base in these species.

Synplacus can also be distinguished by its pedicels which are usually much longer than the calyx, its glabrous or puberulent style, its bilamellate stigma with nearly equal lips, and its membranaceous capsule which is dehiscent to the base along both sutures. The species in this subgenus have been arranged in four sections, *Eumimulus*, *Erythranthe*, *Simiolus*, and *Paradanthus.*

Eumimulus was proposed as a section by Dr. Gray in his first revision of the genus in 1876. In it, he included not only the type species and its immediate allies but all of the species belonging to the subgenus under discussion. *Eumimulus* is characterized by its tubular calyx with equal teeth, its distinctly bilabiate blue corolla without the hairy palatine ridges characteristic of *Simiolus,* and its placentae which separate at the apex. One New Zealand species, *M. linearis*, varies in being an annual and in having exserted stamens. It was described by Robert Brown as the type species of the genus *Uvedalia.* However, when more material was collected the relationship between *Uvedalia* and *Mimulus* became so obvious that the newly described genus was soon relegated to synonymy.

Erythranthe as a genus was based on the single species, *M. cardinalis*, the extreme bilabiate corolla, exserted style and stamens, and hairy anthers being the chief characters used in differentiating it. *Erythranthe* was reduced to synonymy under *Eumimulus* by Gray but later it was raised by Greene to sectional rank. The species in the section are closely affiliated and form a natural group. *M. Nelsonii* is somewhat aberrant with its unequal calyx-teeth and short style.

Simiolus was designated as a section by Greene, who expressed later the opinion that it should be raised to generic rank. In this section, he included not only the plants with personate corollas and inflated calyces but those with nearly regular corollas and prismatic calyces. As interpreted in this paper, *Simiolus* is restricted to a closely connected polymorphic group of North and South American plants. In these the mature calyx is distinctive in that it is much inflated and the lower teeth generally turn up and fold over the lateral teeth, nearly closing the orifice. The yellow corolla is personate with two prominent hairy ridges down the lower lip partly closing the throat; the stamens are included and the placentae firmly united along their entire length. The vegetative characters show more diversity than the floral ones and are of value chiefly in separating the species. This section might have been derived from *Eumimulus,* the calyx diverging in the direction of zygomorphy or it might have been developed from some member of the section *Paradanthus.* The primitive structure of the yellow-flowered *M. moschatus* of the latter section suggests a possible relationship between that species and the section *Simiolus.* It is possible that the polymorphic condition may be a relatively late development. *Simiolus* is a very plastic group, the members responding quickly to environmental changes. Consequently there has been much confusion in the delimitation of the species and the synonymy has become rather burdensome. The early horticulturists found several of these species very satisfactory to experiment with, as a result of which many interesting garden varieties were produced.

In studying the species in the sections, there was found a large number which did not seem to belong to any of the well-established groups. These mostly comprised small closely allied associations which, however, were not sufficiently distinct to warrant being placed in sections by themselves. They all have a more or

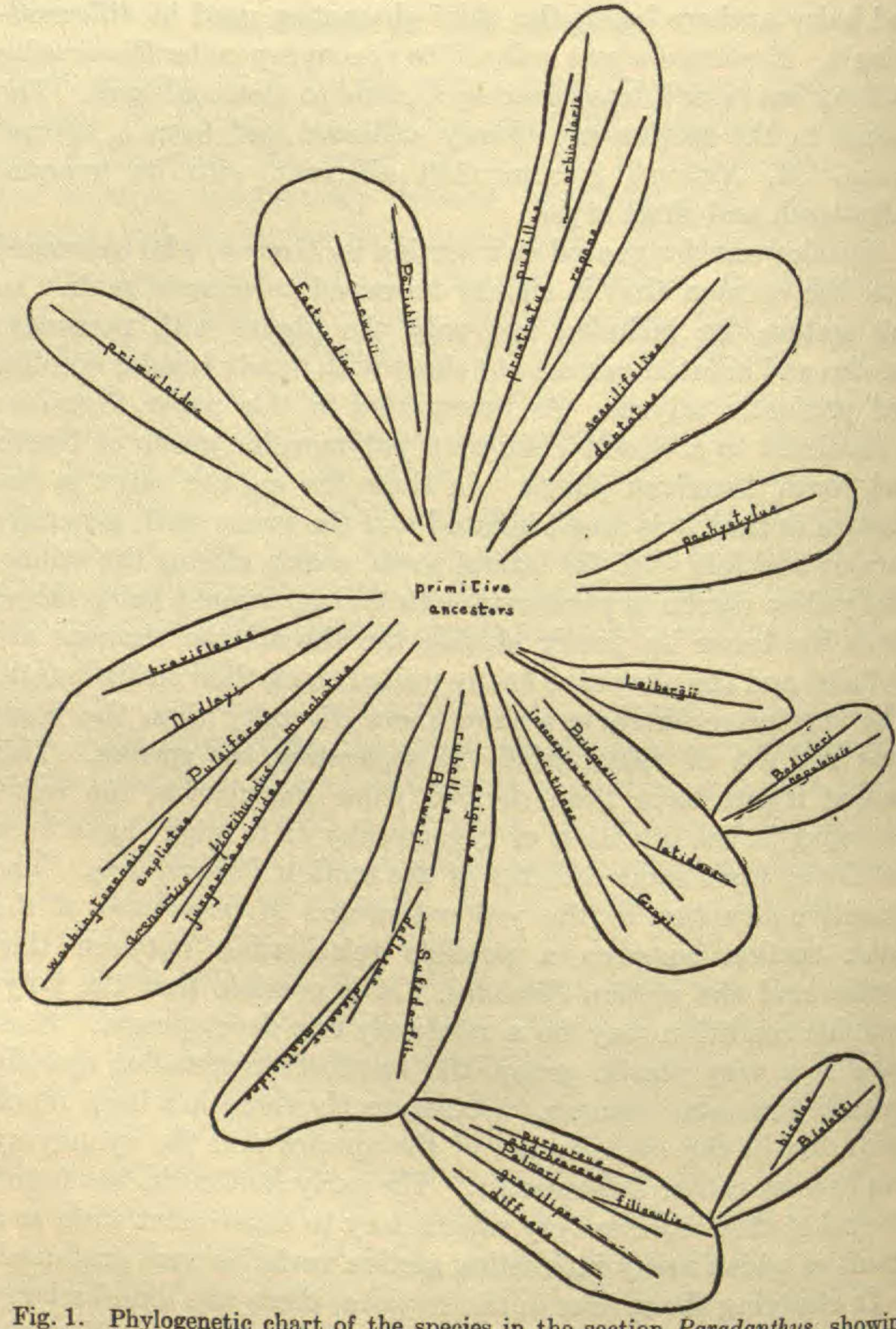

Fig. 1. Phylogenetic chart of the species in the section *Paradanthus*, showing the probable relationship within the group.

less prismatic calyx with equal or subequal teeth and the majority have corollas with funnelform throats and equal lobes. The placentae are united into a central column separating at the apex or, in a few species, divided to the center. These points of similarity form the characteristics of *Paradanthus*, the fourth section. Possibly it will be conducive to taxonomic clearness to consider in greater detail these small groups.

Mimulus rubellus is the center of an assemblage of fairly closely related species. Nearly allied to this species is *M. Breweri*, developing parallel to *Eunanus* as shown by its general glandular-pubescence, its glandular-pubescent style, and its pedicels which are longer or shorter than the flowers. *M. Suksdorfii*, like *M. rubellus*, is almost glabrous. The two species differ only in minor details, and it is possible that *M. Suksdorfii* has been derived from *M. rubellus*. *M. deflexus* is a larger-flowered species with a reddish-purple and yellow corolla which is connected with *M. montioides* through *M. discolor*. *M. exiguus* is, at best, distantly related to this group, its weakly angled calyx setting it aside from the others.

It is possible that the six members of the *M. Palmeri* group have originated from species similar to *M. rubellus; M. gracilipes*, having the placentae divided about one-third of their length, might be an intermediate species between the two groups. *M. Palmeri* is the most widely distributed species although its diversity in color patterns suggests a recent origin. More material may show *M. filicaulis* to be only one of these color forms. *M. androsaceus* and *M. purpureus* are small plants with elongated pedicels; *M. androsaceus*, because of its less branched habit, probably being the older form. *M. Bioletti* and *M. bicolor* have been derived possibly from near *M. Palmeri*. These species agree in having distinctly corky calyx-ribs. *M. bicolor* has a bilabiate corolla, this condition being poorly developed in *M. Bioletti*.

M. nepalensis and *M. Bodinieri*, two Asiatic species closely allied to each other, suggest relationship to *M. inconspicuus* because of the inflated calyces and small corollas.

The *prostratus* alliance is composed of three species from Australia and one from India, all of which are perennials with thick, more or less succulent leaves and blue irregular corollas. *M. repens* has a personate corolla suggesting a possible evolution along lines parallel with *Eumimulus*. With little doubt *M. pusillus* is derived from *M. prostratus*, being mostly a smaller plant with much longer pedicels. No material was seen of *M. orbicularis* and the published descriptions are not sufficiently complete to determine its relationship. It has been left with these Australian species because of its thick succulent leaves, its creeping stems, and its blue corolla.

Notwithstanding the fact that the structure of *M. Lewisii* indicates relationship to *Erythranthe*, it is not possible to include it in that section because of its nearly equal corolla-lobes and included stamens. *M. Eastwoodiae* is possibly a later offshoot of *M. Lewisii.* A resemblance to *M. cardinalis* is suggested by its densely bearded stamens and by the color of its corolla. It is noteworthy in that it is one of the few species in the genus which has developed stolons above ground. *M. Parishii* is a peculiar desert form, probably akin to *M. Lewisii*, in which the corolla has become very small, being little longer than the calyx.

M. dentatus and *M. sessilifolius* form another close alliance. *M. sessilifolius* is a native of Japan, differing from the North American *M. dentatus* mainly in having sessile leaves. It also suggests relationship to *M. nepalensis* through *M. nepalensis* var. *japonica.* The latter, however, has closer affinities with the *M. inconspicuus* group.

M. moschatus is the best-known species of an assemblage of more or less viscid-pubescent perennials or annuals with regular or irregular yellow flowers and linear or narrowly elliptical dark-green leaves. *M. moschatus, floribundus*, and *arenarius* are conspicuous because of the slimy villous hairs which are common in these species.

M. pachystylus, primuloides, and *Leibergii* show no close affiliations with one another or with other groups and may have been derived from older forms now unknown. *M. pachystylus* is one of the few species of *Mimulus* that has been collected in Chiapas, Mexico. Its bilabiate corolla, unequal calyx-teeth, and peculiarly thickened style indicate considerable advancement. *M. Leibergii* has an aspect similar to *M. acutidens* and may be related to that group. The single specimen seen, however, does not show the inflated calyces common to mature specimens in the *M. inconspicuus* group. *M. primuloides* is unlike any of the other species because of its scapose inflorescence. It is a high mountain form common in meadows in the Rocky Mountain and Pacific Coast states.

The members of the second subgenus, *Schizoplacus*, differ from most of those in *Synplacus* not only in their separated placentae but also in their short pedicels and glandular-pubescent styles. The capsule shows considerable diversity in the different sections, varying from membranaceous to coriaceous. Except occasionally in *Eunanus*, *Diplacus*, and *Tropanthus*, it dehisces to the base only along the inner suture and part way or not at all along the outer. The species in *Schizoplacus* readily fall into six sections, *Eunanus*, *Mimulastrum*, *Œnoe*, *Pseudoenoe*, *Tropanthus*, and *Diplacus*.

Bentham proposed *Eunanus* as a genus but at Dr. Gray's suggestion he later reduced it to a section, maintaining, with good reason, that several intermediate species invalidated it as a genus. The chief reasons for raising *Eunanus* to generic rank were the divided placentae, the dehiscence of the capsule, the pubescent style, the small nearly regular corolla, and the annual habit of most of the species. From the small annuals with nearly regular corollas there is, however, a gradual transition through *M. brevipes* and *M. Bolanderi* to the large leaves and distinctly bilabiate corollas of many members of the subgenus *Synplacus*. Although the capsule, as a rule, dehisces down the inner suture and only part way down the outer, in *M. mephiticus* and *M. leptaleus* it opens to the base along both sutures, as in the species in *Synplacus*. The short pedicels and pubescent styles which have been used by some authors as of primary importance in separating *Eunanus* as a genus, are characters of doubtful generic value; besides both are found in several species in the subgenus *Synplacus*. The division of the placentae to the base is not confined to *Eunanus* but is a constant character throughout the subgenus *Schizoplacus*. It is apparent then from the weakness of these characters that *Eunanus* cannot be recognized as a genus and it has been retained, accordingly, as a section.

Mimulastrum.—This is a monotypic section based on *M. mohavensis*, differing from *Eunanus* in its very short corolla-tube, gibbous throat and rotate corolla-lobes. It is clearly an offshoot of the section *Eunanus*, deviating in the direction of an unusual corolla.

Pseudoenoe.—The single species in the section *Pseudoenoe* is a curious desert plant, combining characters of the sections *Diplacus*, *Œnoe*, and *Mimulastrum*. Although *M. pictus* was placed in the section *Mimulastrum* by Dr. Gray, the only character to keep it there is its peculiar corolla, which is similar to that of *M. mohavensis*. The latter species has the calyx, style, and capsule of members of the section *Eunanus*, whereas *M. pictus* has a calyx more like that of *Diplacus*, and the style, stigma, and capsule of *M. Kelloggii* of the section *Œnoe*. The capsules of *M. Kelloggii* and of *M. pictus*, upon being boiled, open in the same manner as that of *Diplacus*; moreover, the rupturing of the calyx by the opening capsule and the woody base of the style which persists in *M. pictus* increases the resemblance to *Diplacus*. Without doubt the very different calyx and capsule prevent leaving *M. pictus* in the section *Mimulastrum* and equally, the peculiar corolla, unlike that of any other *Mimulus* except *M. mohavensis*, prevents putting it in the section *Œnoe*, to which most of its characters indicate relationship.

Œnoe.—The section *Œnoe* is closely related to *Eunanus*, differing in its peculiar calyx and capsule as well as in its long exserted corolla-tube. This last character, however, does not always hold true as through *M. latifolius* and *M. Congdonii* there is a gradual shortening of the corolla-tube until it approaches that of typical *Eunanus*. The capsule in all of the forms studied is very distinct, being cartilaginous, more or less woody and gibbous at the base and indehiscent or tardily dehiscent along the inner suture, often breaking away near the base. The calyx with its very unequal herbaceous teeth, differs from *Eunanus* in that it closely invests the capsule and is gibbous and scarious at the base. *Œnoe* varies from true *Diplacus* inasmuch as the calyx is rarely ruptured by the capsule and, with the exception of *M. Kelloggii*, the type of dehiscence is unlike that of the other sections.

Tropanthus.—The single species belonging to this section is represented by one specimen in the herbarium at the Missouri

Botanical Garden. It is an interesting and instructive plant, because although shrubby, with the glutinous exudation and separated placentae of *Diplacus*, it has equal acute calyx-teeth that suggest *Eumimulus*, a corolla that resembles some of the species in *Erythranthe*, and the type of capsule-dehiscence characteristic of the subgenus *Synplacus*. The calyx is peculiar inasmuch as it becomes spirally twisted over the mature capsule.

Diplacus.—The general conception of the genus *Diplacus* as stated by Nuttall and Greene was of shrubs covered with a glutinous exudation, having revolute leaf-margins and a prismatic calyx closely investing the linear-oblong capsule, the latter splitting down the inner suture, rupturing the calyx, and showing large divided placentae attached to the valves. Herbarium and field work demonstrate that the revolute character of the leaves is a variable one, some species having practically all revolute leaves and others having few or none at all. Furthermore, there is a tendency toward leaves of this kind in some of the species in the *Œnoe* and *Eunanus* sections. The dehiscence of the capsule, rupturing the closely invested calyx, was regarded as a good generic character until the same thing was found in *M. Kelloggii*, a species in every other essential belonging to the section *Œnoe*. The divided placentae, on which the genus was originally based, is characteristic also of the other sections of *Schizoplacus*. Therefore, the only constant characters left for *Diplacus* as a genus were its shrubbiness and peculiar glutinous exudation. In this connection, *M. Clevelandii*, an endemic *Mimulus* growing in San Diego Co. and Riverside Co., shows the typical glandular-villous pubescence of *Eunanus* although definitely suffrutescent. Also *M. Treleasei*, a newly described species collected by Trelease in the state of Puebla, Mexico, though shrubby and having a glutinous exudation, is not in most of its other characters related to *Diplacus*. There are then no sufficient characters for maintaining *Diplacus* as a genus.

PHYLOGENY

Any discussion of the phylogenetic development of this group, as of any group including a large number of closely related species, must, of necessity, be more or less hypothetical. Nevertheless, from the foregoing discussion, a probable line of descent may be surmised.

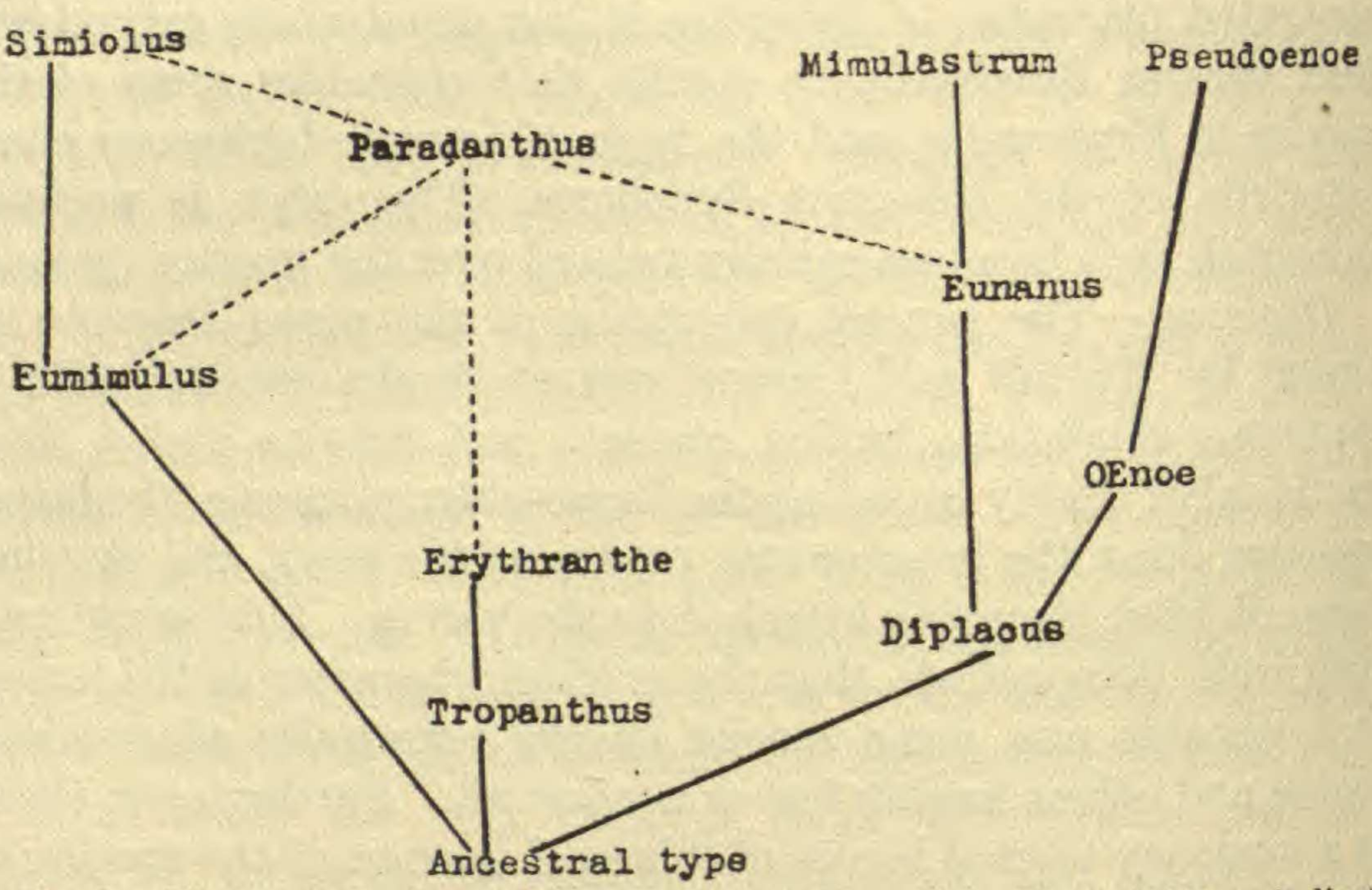

Fig. 2. Phylogenetic chart of the sections in *Mimulus*. The solid lines indicate probable direct descent. The dotted lines show the relationship of the composite group *Paradanthus* to the other sections.

There is nothing in the genus to disprove the assumption that woody plants preceded herbaceous perennials and annuals. *Tropanthus* and *Diplacus*, shrubby forms with regular or irregular calyces, divided placentae, and corollas that are irregular but not personate seem in many ways to be the most primitive of our known groups. These two sections are not closely connected and there is no indication that one preceded the other, nor necessarily that all of the sections came from either of these groups. The wide geographical distribution of *Eumimulus*, the stability of its vegetative and floral characters, and the close relationship of its two groups of species indicate that it is an ancient group; whereas the highly developed personate corolla and blue color suggest considerable advancement from the primitive condition. The regular calyx with its equal teeth might postulate derivation from *Tropanthus*, yet the localized distribution of the latter in a region far removed from any member of *Eumimulus* does not warrant this supposition. It is more likely that *Tropanthus* and *Eumimulus* are offshoots from some ancient and nearly related ancestors which are not now known, and in the course of evolution *Eumimulus* developed its complex floral structure and herbaceous condition. *Simiolus*, with its specialized zygomorphic calyx and its closely adherent placentae, has been derived possibly from some of the North American *Eumimuli* or from some member in the section *Paradanthus*. An extreme polymorphic condition is usually regarded as a recent development and signifies that evolutionary changes are continuing. As suggested elsewhere, the wide geographic distribution of *Simiolus* may be due to the minute seed being carried in mud on the feet of migratory birds. *Erythranthe* is probably an offshoot of *Tropanthus*, as has already been asserted. *Diplacus* is the other shrubby section, and its zygomorphic calyx, irregular corolla, divided placentae, homogeneous species, and fairly wide distribution suggest a group that is somewhat ancient within this family. From it there is a gradual progression to herbaceous groups, most of which are annuals and confined to California. Within each group specialized forms may occur, each of these complex species being more or less isolated and usually growing in a much restricted area. *Pseudoenoe* with its peculiar corolla is presumably a recent offshoot of *Œnoe*. Through *M. latifolius* and *M. Congdonii* there is a progressive transition from the long slender corolla-tube of *Œnoe* to the short funnelform, campanulate, or bilabiate corolla of *Eunanus*. The species in *Eunanus* are closely related, many of them being of difficult discrimination and separated only by minor characters. Great variation and closely connected species indicate that the group is still in a process of evolution, and *Eunanus* therefore is probably of recent origin, though its corolla, in some cases, is quite primitive. *Mimulastrum* is descended from *Eunanus*, differing from it mainly in its characteristic corolla. *Paradanthus*, as stated earlier, is a collection of groups not necessarily related to one another and in all probability most of them have been derived from members of the other sections.

GEOGRAPHICAL DISTRIBUTION

The genus *Mimulus* offers very interesting problems in distribution. Of the 114 species admitted in this monograph, 74

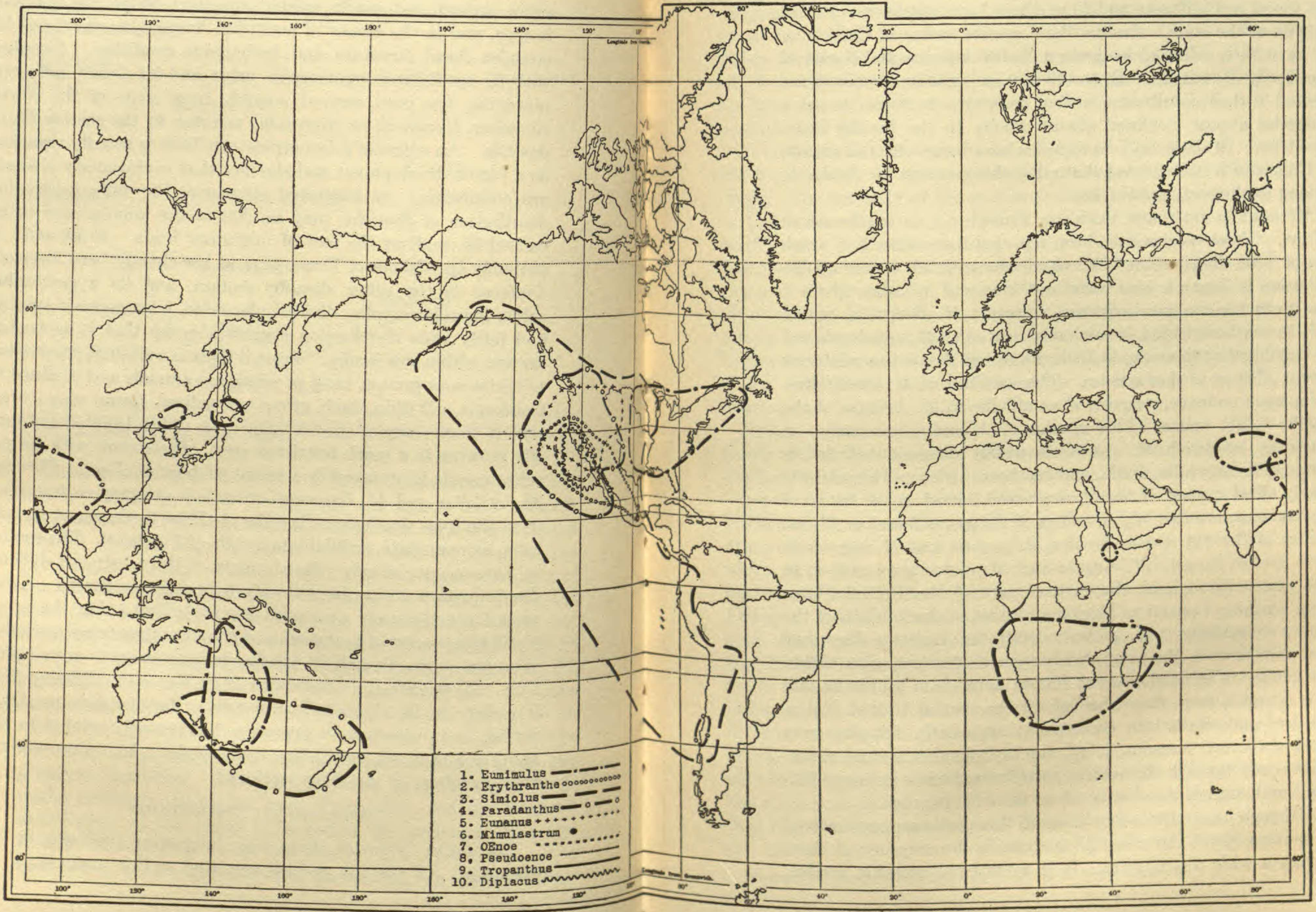

FIG. 3. MAP SHOWING THE GEOGRAPHICAL DISTRIBUTION OF THE SECTIONS IN MIMULUS.

are found in California and 51 of these have not been collected outside of the state. Besides these species native in California, 16 have been collected in western North America and 3 east of the Rocky Mountains. Of the 19 species found in Mexico, 6 are limited in their distribution to that country. In South America 8 species appear, confined almost wholly to the Pacific Coast countries. Of these, only two species have been collected outside of Chile and it is of interest that all of them, except *M. Bridgesii*, belong to the section *Simiolus*.

Mimulus is not found native in Europe nor in northwestern Africa. Three species have been reported from Asia, 2 of which are of wide distribution. *M. nepalensis* with its center of distribution in Japan is also found in China and in India, where it has given rise to one distinctive variety. *M. Bodinieri*, native only in southern China, is so closely related to *M. nepalensis* and so variable that there can be little doubt but that it is a relatively recent offshoot of that species. The structure of *M. sessilifolius*, a Japanese endemic, suggests close affinity to *M. dentatus* of the Pacific Coast states. Five species of *Mimulus* are native in Australia, of which *M. gracilis* is widely disseminated and is common in Australia, India, and southern Africa. This and the nearly allied species, *M. madagascariensis*, found on the Island of Madagascar, are the only members of the genus found in Africa.

Few of the 114 species besides *M. gracilis* and *M. nepalensis* have a wide range. *M. ringens* and *M. alatus* are common in wet places throughout the eastern part of the United States from southern Canada to Florida and west to the foothills of the Rocky Mountains. *M. glabratus* with its varieties *Fremontii* and *parviflorus* is the most widely spread of any species within the genus. The northernmost station noted is in Manitoba and it is common from there throughout the central United States, Mexico, and south into Guatemala: apparently skipping over most of Central America, it appears in Colombia, Ecuador, and Bolivia and through the variety *parviflorus* extends its range into Chile and Argentina as far south as the 44th parallel.

Although nearly three-fourths of all the species are encountered in western North America, *M. guttatus* is the only one of these having a wide distribution. It is a very polymorphic species, common along the coast from Alaska to Mexico and inland as far as the Rocky Mountain states. It is noteworthy that the widely distributed species in *Mimulus* grow only in wet places and it is therefore probable, as Pennell[1] suggested, that birds are instrumental in the dispersal of the seeds, carrying them in mud on their feet.

In contradiction to these widely distributed members of the genus, all of the rest of the species have a more or less restricted range. The majority of the species in *Schizoplacus* are confined to California where most of them are localized in relatively small areas. *Tropanthus* is exceptional in that its only species is apparently limited to Tehuacan in southern Mexico. *Œnoe* and *Diplacus* are practically confined to California, two species in *Œnoe* and one in *Diplacus* occurring in southern Oregon and two species in *Diplacus* appearing in the northern part of Lower California. *Eumimulus* is interesting in this connection as it is the only section besides *Tropanthus* in which none of the members are found in California.

Habitat.—In habitat there is considerable diversity. Practically all of the species of *Eumimulus* and *Simiolus* grow in shallow standing water, in swamps, or along the banks of running streams and are therefore decidedly hydrophytic. The members of *Erythranthe* are usually found along the edges of stream banks. Many of the species in *Paradanthus* grow thickly in spots from which water has evaporated after standing all winter. This is also true of most of the species in *Œnoe* and for some of those in *Eunanus*. Most *Eunanus* species, however, are found in dry open sandy places, the plants often forming large patches in granite sand on exposed slopes. Several of the species commonly follow chaparral fires. *Diplacus*, one of the two shrubby groups in the genus, grows in fairly dry places and is sufficiently abundant in some situations to become a component of the chaparral. *Mimulastrum* and *Pseudoenoe* belong in hot dry regions occurring only in the desert or semi-desert areas in California. *Tropanthus* has coriaceous leaves covered with sessile glands which indicate that it grows in exposed places. Thus, within the genus, there are plants which are hydrophytic, mesophytic, or xerophytic.

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[1] Pennell, in Contr. U. S. Nat. Herb. **20**: 314. 1920.

Hybrids

The many intermediate forms of the section *Diplacus* found in southern California, showing all gradations in color, size, and shape of the corolla between the two common species *M. longiflorus* and *M. puniceus,* suggested that these two species must hybridize in nature. In support of this theory, the results of some work done by Dr. Loye Miller[1] when a graduate student at the University of California are of particular interest. Dr. Miller crossed a plant of *M. longiflorus* from near Los Angeles with a plant of *M. puniceus* from near San Diego. With *M. puniceus* as the female parent, the cross was successful; the reciprocal cross, however, gave no results. In plants of the first generation were combined characters of both parents, as would be expected. The flowers were salmon-colored with the long-tubed large corollas of *M. longiflorus* and the intermediate type of pubescence between the parents. The plants produced little pollen so that it was difficult to get seed from self-pollinated flowers. Nevertheless, some were obtained and plants of the F_2 generation showed red, yellow, and salmon flowers, the salmon ones being the most abundant. Specimens were collected from these plants which were growing in the botanical gardens at the University of California in 1918. These were later compared with a large series of plants of intermediate color forms chiefly collected by Dr. P. A. Munz, Ivan Johnston, and Robert Harwood, of Pomona College, in the foothills between Los Angeles and San Diego. These plants could readily be separated into four groups, according to the color, shape, and size of the corolla, the length and shape of the calyx, and the presence or absence of hairs on the calyx. Members of two of these groups corresponded very closely with the specimens of the experimentally produced hybrids. In view of this it is probable that further work would yield plants corresponding to the other groups. Typical *M. longiflorus* is found from Santa Barbara Co. to southern Los Angeles Co., rarely as far as Lower California. From Los Angeles Co. southward, it extends into the district where *M.*

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[1] The interesting results of the experimental study outlined above were sent to the writer by Dr. Miller. They have not been previously published because the work was not completed.

puniceus is found, and it is in this overlapping area that most of the intermediates have been collected.

In the middle of the nineteenth century, European gardeners secured several hybrid species by crossing *M. aurantiacus* and *M. puniceus*. These two parents do not have the same natural geographical range, *M. aurantiacus* being confined to the foothills in California north of Santa Barbara Co. and *M. puniceus* occurring south of Los Angeles, with its center of distribution near San Diego. Therefore, hybrids between them would not be looked for except in gardens.

Economic Uses

Mimulus has little value from an economic standpoint except in furnishing some easily cultivated ornamental plants. On account of the crisp leaves and agreeable taste, *M. luteus* and *M. glabratus* are cooked as greens or in soup or eaten as a salad by the natives in many parts of South America. It is locally called "placa" or "la polcura." Hieronymus says that in Argentina the leaves of *M. parviflorus* are considered an excellent remedy for liver trouble.

Abbreviations

Abbreviations indicating the herbaria where specimens cited in this monograph are deposited are as follows:

Calif. = University of California Herbarium
Calif. Acad. = California Academy of Sciences Herbarium
Cornell = Cornell University Herbarium
Davidson = A. Davidson Herbarium
Deam = C. C. Deam Herbarium
Drushel = J. A. Drushel Herbarium
Epling = Carl Epling Herbarium
F = Field Museum of Natural History Herbarium
G = Gray Herbarium
Greene = E. L. Greene Herbarium
K = Kew Herbarium
M = Missouri Botanical Garden Herbarium
N. Y. = New York Botanical Garden Herbarium
Ore. = Oregon Agricultural College Herbarium

Phil. = Philadelphia Academy of Natural Sciences Herbarium.
Pomona = Pomona College Herbarium
R. Mt. = Rocky Mountain Herbarium
Stanford = Stanford University Herbarium
U. S. = United States National Herbarium
Wellesley = Wellesley College Herbarium

TAXONOMY

Mimulus L. Sp. Pl. **2**: 634. 1753, and ed. 2, **2**: 884. 1763; Gen. Pl. ed. 5, 283. 1754; Adans. Fam. Pl. **2**: 211. 1763; Willd. Sp. Pl. **3**: 360. 1800; Nutt. Gen. **2**: 50. 1818; Benth. Scroph. Ind. 27. 1835; DC. Prodr. **10**: 368. 1846; Endl. Gen. 681. 1836–40; Hook. Fl. Bor. Am. **2**: 99. 1840; Steudel, Nom. 534. 1821, and ed. 2, 150. 1841; Pfeiffer, Nom. Bot. 2^1: 320. 1874; Gray in Proc. Am. Acad. **11**: 95. 1876, excl. section *Mimuloides;* Syn. Fl. N. Am. 2^1: 273. 1878, ed. 2, and Suppl. 442. 1886, excl. section *Mimuloides;* Benth. & Hook. f. Gen. Pl. **2**: 946. 1876, excl. section *Mimuloides;* Greene in Bull. Calif. Acad. Sci. **1**: 106. 1885, excl. section *Mimuloides;* Curran in Proc. Calif. Acad. Sci. II. **1**: 258. 1888, excl. *M. pilosus;* Baillon, Hist. Pl. **9**: 450. 1888; Durand, Gen. Phaner. 294. 1888, excl. section *Mimuloides;* Wettst. in Engl. & Prantl, Nat. Pflanzenfam. 4^{3b}: 71. 1891; Dalla Torre & Harms, Gen. Siph. 457. 1900–1907; Pennell in Torreya **19**: 147. 1919.

Cynorrhynchium Mitch. in Acta Acad. Nat. Cur. **8**: App. 207. 1748.

Monavia Adans. Fam. Pl. **2**: 211. 1763.

Uvedalia R. Br. Prodr. 440. 1810, and 124. 1821; G. Don, Hist. Dichlam. Pl. **4**: 555. 1838.

Erythranthe Spach, Hist. Nat. Veg. Phaner. **9**: 312. 1840.

Diplacus Nutt. Ann. Nat. Hist. I. **1**: 137. 1838; Curtis, Bot. Mag. II. **12**: *pl. 3655.* 1838; Greene in Bull. Calif. Acad. Sci. **1**: 94. 1885; Pittonia **2**: 151. 1890.

Eunanus Benth. in DC. Prodr. **10**: 374. 1846; Greene in Bull. Calif. Acad. Sci. **1**: 96. 1885.

Annuals, herbaceous perennials, or shrubs, glabrous, viscid or glandular-pubescent, pilose or slimy-viscid. Leaves opposite, sessile or petioled, simple, entire, toothed or sometimes lobed, the upper commonly much reduced. Flowers solitary, axillary, or terminal, often disposed in open racemes. Calyx tubular or campanulate, 5-angled, 5-toothed, mostly plicate, persistent and often accrescent; teeth equal or unequal. Corolla bilabiate or equally lobed, blue, red, reddish-purple, yellow or rarely white; tube cylindrical or funnelform, included or exserted, expanding gradually or abruptly into a long or short throat;[1] upper lip exterior in the bud, 2-lobed, erect or spreading; lower lip mostly longer, 3-lobed, spreading and usually with 2 hairy protuberances or patches in the throat. Stamens 4, with no indications of a fifth, didynamous, included or exserted; filaments mostly glabrous, more or less adnate to the lower part of the corolla; anthers 2-celled, confluent at the apex, base more or less divaricate. Pistil bicarpellary; ovary 2-celled; style glabrous or pubescent, commonly longer than the stamens, included or exserted; stigma bilamellate or peltate-funnelform, lobes equal or unequal. Capsule oblong or linear, 2-valved, often sulcate, membranaceous to cartilaginous, loculicidally dehiscent, rarely indehiscent; placentae separating and the halves adherent to the valves or united and forming a central column. Seeds small, numerous, oval, smooth or reticulate.

Type species: *M. ringens* L. Sp. Pl. 634. 1753.

SYNOPSIS OF THE SUBGENERA AND SECTIONS

Subgenus I. SYNPLACUS Grant. Placentae completely united into a central column or parting less than half way to the base; pedicels usually longer than the calyx; style glabrous or puberulent, rarely pubescent; capsule mostly dehiscent to the base along both sutures.

A. Calyx-teeth equal or subequal.
  a. Corolla-lobes distinctly unequal.
    α. Corolla-throat nearly closed by the prominent palate....§ 1. *Eumimulus*
    β. Corolla-throat broad and more or less open.
      I. Calyx-teeth 4–6 mm. long......................§ 2. *Erythranthe*
      II. Calyx-teeth less than 3 mm. long..............§ 3. *Paradanthus*
  b. Corolla-lobes equal or subequal.........................§ 3. *Paradanthus*

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[1] The term "throat" is used throughout this monograph with the meaning expressed by Dr. Gray in his 'Structural Botany'—"The orifice of a gamopetalous corolla or calyx, including any portion between this and the proper tube."

B. Calyx-teeth unequal, the posterior tooth larger than the others.
  a. Lower teeth of mature capsule folding over the lateral and upper tooth; corolla yellow.................................§ 4. *Simiolus*
  b. Lower teeth of mature capsule not folding over the lateral and upper tooth; corolla red..................................§ 2. *Erythranthe*

Subgenus II. Schizoplacus Grant. Placentae mostly separating to the base and adherent to the valves; pedicels usually shorter than the calyx; style glandular-pubescent; capsule mostly dehiscent to the base along the inner suture and part way or not at all along the outer.

A. Herbaceous plants.
  a. Capsule membranaceous, not gibbous nor oblique at the base.
    α. Corolla tubular-funnelform to nearly campanulate; style glandular-pubescent along the upper half........................§ 5. *Eunanus*
    β. Corolla salverform, lobes rotate; style pubescent along its entire length.......................................§ 6. *Mimulastrum*
  b. Capsule cartilaginous, gibbous or oblique at the base.
    α. Corolla-tube much exserted, lobes erect or spreading........§ 7. *Œnoe*
    β. Corolla-tube included, lobes rotately spreading........§ 8. *Pseudoenoe*
B. Shrubs or suffrutescent plants.
  a. Mature calyx twisted over the capsule, teeth equal......§ 9. *Tropanthus*
  b. Mature calyx not twisted, teeth unequal................§ 10. *Diplacus*

Subgenus I. Synplacus Grant

Subgenus I. Synplacus Grant, new subgenus.

Perennial or annual herbs, slimy-viscid, glandular-pubescent or glabrous; pedicels mostly longer than the calyx; corolla bilabiate or with equal or subequal lobes; stamens included or exserted, glabrous or pubescent; style glabrous or occasionally puberulent or glandular; stigma bilamellate, usually with equal lips; capsule membranaceous, shorter than the persistent calyx, mostly dehiscent to the base along both sutures; placentae completely united in a central column or separating at the apex, rarely divided to the middle. Sect. 1–4.

Section 1. Eumimulus Gray

§1. Eumimulus Gray in Proc. Am. Acad. **11**: 97. 1876, as to *M. ringens* and *M. alatus;* Syn. Fl. N. Am. **2**^{1}: 276. 1878, ed. 2, and Suppl. 446. 1886, as to *M. ringens* and *M. alatus* only; Greene in Bull. Calif. Acad. Sci. **1**: 107. 1885; Wettst. in Engl. & Prantl, Nat. Pflanzenfam. **4**^{3b}: 72. 1891, as to *M. ringens* and *M. alatus;* Dalla Torre & Harms, Gen. Siph. 457. 1900–1907.

Herbaceous plants; stems quadrangular, mostly glabrous; leaves dark green, not viscid nor slimy, 1-nerved or pinnately veined; inflorescence racemose; calyx prismatic, sharply angled, little or not at all inflated when mature, teeth equal; corolla personate, blue, varying to white in some specimens; anthers and style glabrous, stigma-lips equal; capsule membranaceous, about as long as the calyx, dehiscent to the base along both sutures, the placentae separating at the apex. Sp. 1–5.

KEY TO THE SPECIES

A. Leaves pinnately veined.
  a. Leaves mostly sessile; pedicels more than one-half as long as the leaves ....*1. M. ringens*
  b. Leaves petioled; pedicels mostly less than one-half as long as the leaves ....*2. M. alatus*
B. Leaves not pinnately veined.
  a. Leaves 1-nerved.
    α. Stamens included....................................*3. M. gracilis*
    β. Stamens exserted....................................*5. M. linearis*
  b. Leaves 3-nerved....................................*4. M. madagascariensis*

1. **M. ringens** L. Sp. Pl. 634. 1753; Walter, Fl. Caroliniana, 172. 1788; Curtis, Bot. Mag. I. **8**: *pl. 283.* 1794; Willd. Sp. Pl. **3**: 360. 1800; Michx. Fl. Bor. Am. **2**: 23. 1803; Persoon, Syn. Pl. **2**: 163. 1807; Pursh, Fl. Am. Sept. **2**: 426. 1814; Nuttall, Gen. **2**: 51. 1818; Lodd. Bot. Cab. **5**: *pl. 410.* 1820; Elliot, Bot. S. Carolina & Ga. **2**: 124. 1824; Torrey, Comp. Fl. North. & Middle States, 242. 1826; Nat. Hist. N. Y. **2**: 36. 1843; Hook. Fl. Bor. Am. **2**: 100. 1840; Benth. Scroph. Ind. 28. 1835; DC. Prodr. **10**: 369. 1846; Gray, Manual, 299. 1848; Proc. Am. Acad. **11**: 98. 1876; Syn. Fl. N. Am. **2**^{1}: 276. 1878, ed. 2, and Suppl. 446. 1886; Greene in Bull. Calif. Acad. Sci. **1**: 107. 1885; Coulter, Contr. U. S. Nat. Herb. **2**: 309. 1892; Robinson & Fernald in Gray, Manual, ed. 7, 723. 1908; Britton & Brown, Ill. Fl. **3**: 157, *fig. 3265.* 1898, and ed. 2, **3**: 190, *fig. 3775.* 1913; Britton, Manual, 827. 1901, and ed. 2, 1905; Small, Fl. Southeastern U. S. 1062. 1903, and ed. 2, 1062. 1913; Pennell in Torreya **19**: 148. 1919.

M. pallidus Salis. Prodr. 99. 1796.

M. acutangulus Greene, Leafl. Bot. Obs. & Crit. **2**: 1. 1909.

M. ringens var. *congesta* Farwell, Rept. Mich. Acad. Sci. **19**: 249. 1917.

M. ringens f. *Peckii* House in Bull. N. Y. State Mus. **1921**: 17. 1923.

Perennial by stoloniferous rootstocks, produced late in the season, the whole plant glabrous; stem 4–13 dm. high, simple or branched, 4-angled, the angles sometimes slightly winged; leaves thin, oblong or oblong-lanceolate, 2.5–10 cm. long, .5–3 cm. wide, acute or obtuse, serrate, rarely entire, tapering to a broad, often auriculate-clasping sessile base, or rarely some of the leaves with a short, broad-margined petiole, occasionally with smaller leaves fascicled in the axils; pedicels stout, 2–3.5 cm. long, mostly shorter than the subtending leaves; calyx tubular, becoming broadly oblong in fruit, 1.4–1.7 cm. long, strongly angled, teeth slender, subulate or aristate, about one-fourth as long as the tube, sinuses broad, ciliate; corolla 2.5–3.5 cm. long, blue, rarely pink or white, tube exserted, slightly funnelform, throat nearly closed, upper lip erect, strongly reflexed, lower lip longer and spreading, the margins often erose; upper pair of stamens slightly exserted; style exserted, stigma bilamellate, with broad, rounded, equal lips; capsule included, broadly oblong; seeds oblong, papillate.

Distribution: common in wet places from Canada to Florida, west to North Dakota, and south to Texas.

Specimens examined:

Ontario: Ashdod, 24 July, 1893, *Fowler* (M); Farm Point, Gatineau River, Quebec, 20 Aug., 1911, *Macoun 80935* (Cornell); wet places, Lincoln Co., 29 July, 1897, *McCalla 457* (Cornell).

Maine: river intervale, Orono, Penobscot Co., 29 July, 1895, *Fernald 364* (M).

New Hampshire: Hanover, 15 July, 1910, *Barss* (Ore.); Laconia, 1892, *Carter* (Cornell).

Vermont: Barnet, Caledonia Co., 28 July, 1884, *Blanchard* (M).

Massachusetts: between South Sudbury and Framingham, 2 Aug., 1903, *Greenman 2112* (M); brookside, Granville, 20 Sept., 1913, *Seymour 25* (M); meadows, Scituate, 19 Aug., 1870, *Morong 66* (M); border of stream, Adams, 24 Aug., 1901, *Day 9* (R. Mt.).

Connecticut: Middletown, Sept., 1835, *Buckley* (M).

New York: Keene Valley, Essex Co., 1 Aug., 1891, *Schrenk* (M);

in uliginosis, Gouverneur, 22 July, 1873, *Redfield 6121* (M); Fleishmann's, Delaware Co., 30 July, 1892, *Schrenk* (M); frequent in swamps and along springs, Chemung Co., 20 July, 1893, *Lucy 154* (R. Mt.); Van Rensselaer Swamp, Rensselaer Co., 27 July, 1903, *Cipperly* (Cornell); marsh, Ithaca, 17 June, 1878, *Trelease* (M); Renwick Flats, Ithaca, 12 July, 1916, *Munz 328* (Pomona); Keep Woods, east of Lockport, 17 July, 1895, *Townsend* (Cornell); River Flats, Truxton, 5 July, 1894, *Wiegand* (Cornell); Syracuse, July, 1889, *Overacker* (Cornell).

New Jersey: moist shaded place, Greenwood Lake, Passaic Co., 11 Aug., 1907, *Mackenzie 2837* (M); Peakack, July, 1886, *Perry* (M).

Pennsylvania: West Manchester, 10 Aug., 1898, *Eisenhower* (M); swamps, Lower Merion, 19 Aug., 1874, *Redfield 6128* (M); Susquehanna, July, 1889, *A. F. Eby* (M); Pequea, July, 1889, *J. H. Eby* (M); Dillerville, 1888, *J. H. Eby* (M); Meadville, Aug., 1893, *C. D. Curtis 68* (Pomona).

Maryland: Mill Creek, 25 July, 1902, *Shull 103* (M).

District of Columbia: moist places, 3 Aug., 1892, *Blanchard* (M); low and swampy clay, 26 or 27 July, 1893, *Boettcher 245* (M and R. Mt.).

West Virginia: near Bucklin, 5 Aug., 1895, *Pollock* (M).

North Carolina: moist soil, Biltmore, 3 Aug. (flower), 30 Sept., 1897 (fruit), *Biltmore Herb. 638b* (M); side of Tryon Mts., 20 July, 1899, *Townsend* (Cornell).

South Carolina: Whitmer Park, *Anderson*, 4 Aug., 1917, *Davis* (Stanford).

Georgia: Georgia, 1833, *Beyrich* (M).

Alabama: Auburn, Lee Co., 8 Aug., 1897, *Earle & Baker* (M and R. Mt.).

Ohio: rich moist sandy soil, Berlin Heights, Erie Co., 31 July, 1914, *MacDaniels 137* (Cornell); Rocky River near Cleveland, 1892, *Greenman 1528* (M); Drushel Farm, Holmes Co., 25 July, 1913, *Drushel 888* (M and Drushel); in wet places near Canton, without date, *Riehl 41* (M); morasses, Canton, Aug., 1835, *Riehl* (M); ditch, Bowling Green, 19 Aug., 1919, *Moseley* (M).

Tennessee: Carroll Co., 5 Aug., 1897, *Eggert* (M); swamps, Knox

Co., 18 June, 1898, *Ruth 569* (M); damp soil, Fountain City, 22 July, 1904, *Ruth 106* (M); wet places, Knoxville, Sept., 1895, *Ruth* (Pomona).

Kentucky: near Poor Fork Post Office, Harlan Co., Aug., 1893, *Kearney 225* (M).

Illinois: Chicago, 20 Aug., 1893, *Glatfelter 328* (M); River Forest, Cook Co., 15 July, 1896, *Chase* (M); Cahokia, 30 July, 1878, *Eggert* (M and R. Mt.); wet places, St. Clair Co., 26 July, 1877, *Eggert* (M); Chicago, 13 Aug., 1892, *Moffatt 1652* (R. Mt.); swampy ground, Peoria, July, 1900, *McDonald* (R. Mt.).

Indiana: low borders of swale, Blackford Co., 16 July, 1905, *Deam 58* (M); in marsh near Culver, near Lake Maxinkuckee, 25 July, 1900, *Scovell & Clark 1193* (Stanford).

Iowa: Ames, without date, *Hitchcock* (M); Ames, 1892, *Carver* (M); wet places, Decatur Co., 17 Sept., 1904, *Anderson* (M and R. Mt.); Des Moines, 18 Sept., 1895, *Carver* (M); wet prairies, Armstrong, Emmet Co., 1884, *Cratty* (Stanford); wet soil, Allamakee Co., 28 June, 1895, *Fitzpatrick & Fitzpatrick* (R. Mt.).

Michigan: in ditch, Ingleside, Cheboygan Co., 28 July, 1917, *Gates & Gates 10660* (M); Mich. Agr. Coll., 14 July, 1888, *Lake* (Ore.); wet places, St. Joseph, 14 July, 1903, *Mell* (R. Mt.).

Wisconsin: Madison, 22 July, 1889, *Trelease* (M).

North Dakota: Lisbon, 4 July, 1898, *Fieldstad* (R. Mt.).

South Dakota: creeks, Brookings, 10 July, 1893, *Thornber* (M); Brookings, 1892, *Williams* (R. Mt.).

Missouri: Venice, 16 Aug., 1885, *Wislizenus 265* (M); East Carondelet, 17 July, 1890, *Hitchcock* (M); margin of lakes in American bottoms, Aug., 1841, *Engelmann* (M); Jefferson Barracks, 11 Sept., 1886, *Pammel* (M); low wet places, common along all the little streams, Jackson Co., 14 July, 1889, *Bush 1047* (M); frequent in low grounds, Harlem, 23 July, 1899, *Mackenzie* (M); West Hannibal, 17 July, 1913, *Davis 129* (M); Webb City, 25 Sept., 1908, *E. J. Palmer 1481* (M); wet places, Montier, 23 Oct., 1908, *Bush 5320* (M); low ground, Courtney, 4 Oct., 1917, *Bush 8246* (M).

Oklahoma: Cleveland Co., 7 Aug., 1900, *White 80* (M. and R. Mt.).

Kansas: moist places, Riley Co., Aug., 1897, *Pond 1082* (M); Manhattan, 31 Aug., 1892, *Norton* (M).

Nebraska: Lincoln, Aug., 1888, *Webber* (M); Red Bird Creek, 26 July, 1893, *Clements 2786* (Cornell).

Minnesota: Minnetonka, Oct., 1886, *Davidson* (Pomona); Nicollet, July, 1892, *Ballard* (R. Mt.); Portage, 18 July, 1891, *Woods* (R. Mt.).

M. ringens is one of the common species in the genus and can be distinguished by its blue personate corolla, its long pedicels, and its usually sessile leaves.

1a. Var. **minthodes** (Greene) Grant, comb. nov.

M. minthodes Greene, Leafl. Bot. Obs. & Crit. **2**: 1. 1909.

Leaves elliptical, acute at each end and often short-petioled.

Distribution: southeastern United States.

Specimens examined:

Georgia: wet meadow, Lafayette, 925 ft. alt., 2 Aug., 1900, *Harper 342* (N. Y.).

Maryland: Front Pike, College Park, 3 Oct., 1900, *Pond* (M).

The variety merges into the species through such specimens as *Seymour 25* from Massachusetts, *Shull 103* from Maryland, and *Blanchard's* specimen from Washington, D. C. In this last specimen some of the leaves are short-petioled or sessile by a narrow base and the others are broad and auriculate-clasping. *Boettcher 245* from Washington, D. C., has both clasping and short-petioled leaves on the same plant and the upper part of the stem is winged. Overacker's specimens from Syracuse, N. Y., and Lake's specimens from the Michigan Agricultural College show winged stems also. As is usual with blue-flowered plants, occasional plants are found with white or pale pink corollas. Examples of these are to be found in the following specimens collected in New York: Ithaca, 20 July, 1878, *Dudley* (Cornell); damp soil along Glenwood Road, Ithaca, 19 Aug., 1913, *E. L. Palmer 1089* (Cornell); West Marsh, Ithaca, 19 Aug., 1913, *E. L. Palmer 1084* (Cornell).

2. M. alatus Ait. Hort. Kew. **2**: 361. 1789; Willd. Sp. Pl. **3**: 361. 1800; Pursh, Fl. Am. Sept. **2**: 426. 1814; Bart. Fl. N. Am. **3**: *pl. 94.* 1823; Sprengl. Syst. Veg. ed. 16, **2**: 799. 1825; Walp. Rep. **3**: 275. 1844–45; Lodd. Bot. Cab. *pl. 410.* 1820;

Benth. Scroph. Ind. 28. 1835; DC. Prodr. **10**: 369. 1846; Gray in Proc. Am. Acad. **11**: 98. 1876; Syn. Fl. N. Am. **2**^{1}: 276. 1878, and ed. 2, 1886; Greene in Bull. Calif. Acad. Sci. **1**: 107. 1885; Coulter, Contr. U. S. Nat. Herb. **2**: 309. 1892; Britton & Brown, Ill. Fl. **3**: 158. *fig. 3266.* 1898, and ed. 2, **3**: 190. *fig. 3776.* 1913; Britton, Manual, 827. 1901; Small, Fl. Southeastern U. S. 1063. 1903; Robinson & Fernald in Gray, Manual, ed. 7, 723. 1908; Pennell in Torreya **19**: 148. 1919.

M. alatus f. *albiflorus* House in Bull. N. Y. State Mus. **1921**: 17. 1923.

Stems stoloniferous, glabrous, 2–7 dm. high, simple or branched, 4-angled, the angles more or less winged; leaves broadly ovate to ovate-lanceolate, acute, 5–15 cm. long, 2–6 cm. high, serrate, tapering to a narrow margined petiole, 1–1.5 cm. long; pedicels stout, mostly shorter than the calyx; calyx oblong, 1.4–1.7 cm. long, angles sharp, teeth 1.5 mm. long, broad, mucronate; corolla blue or violet, sometimes tinged with pink, rarely white, 2–2.5 cm. long, tube slightly exserted, throat nearly closed, lobes of the upper lip erect, strongly reflexed, the lower lip longer and spreading; stamens and style included; capsule ovate, obtuse; seeds oval, papillate.

Distribution: common in the Atlantic states from Massachusetts to South Carolina, west to the Mississippi River and south to Texas.

Specimens examined:

Massachusetts: Cambridge, 26 July, 1875, *Bailey* (Stanford).

Pennsylvania: Northampton Co., 1878, *Raw 47* (M); Conewago Mts., July, 1898, *Eisenhower* (M); Smithville, Lancaster Co., 3 Sept., 1892, *Heller & Halbach 633* (Cornell and M); Pittsburgh, 1831, *Volz* (M); low woods along Trout Run, Wawa, Delaware Co., 29 July, 1904, *Painter 816* (M); Dillerville, Aug., 1889, *A. F. Eby* (M); Safe Harbor, July, 1889, *A. F. Eby* (M).

New Jersey: Bloomfield, July, 1877, *Rusby* (Cornell).

District of Columbia: low ground, 31 July, 1896, *Steele* (M); along shaded streams, Anacostia, 24 July, 1904, *Painter 760* (M).

Virginia: along Hunting Creek near Alexandria, 12 Aug., 1902, *Shull 206* (M); Fairfax Co., Aug., 1865, *A. H. Curtis* (Cornell).

South Carolina: Batesburg, 20 Aug., 1913, *McGregor 223* (Stanford).

West Virginia: near Bucklin, 8 Aug., 1894, *Pollock* (M, R. Mt., and Cornell)

Tennessee: low wet grounds, Knoxville, 18 June, 1898, *Ruth 568* (M); wet places, Knoxville, Sept., 1895, *Ruth* (R. Mt.).

Kentucky: Bowling Green, 20 Sept., 1894, *Price* (M); South Hills, 3 miles south of Louisville, 19 Aug., 1892, *Bergman* (Cornell); low muddy river banks, Wickliffe, Ballard Co., 25 Sept., 1919, *E. J. Palmer 16582* (M).

Ohio: Berea, 3 Aug., 1895, *Ashcroft* (Pomona); Berea, July, 1896, *Ashcroft* (M); Perkisis, Erie Co., 11 Aug., 1894, *Moseley* (M); dry creek bed, Beechwood Camp, 7 Aug., 1910, *Overholts* (M); Burnet Woods, Cincinnati, June, 1875, *James* (Stanford).

Indiana: in low woods, Wells Co., 3 Aug., 1905, *Deam 133* (M): damp ravine in woods in Robinson Park, Allen Co., 19 Aug., 1906, *Deam 1577* (Deam); in low woods near Chestnut Ridge, Jackson Co., 11 Aug., 1911, *Deam 9507* (Deam).

Illinois: wet places, Prairie du Pont, 3 Aug., 1875, *Eggert* (M); Cahokia, 30 July, 1878, *Eggert* (M and R. Mt.); Millstadt Junction, 9 Sept., 1891, *Douglas* (M); Cahokia, 13 Aug., 1890, *Hitchcock* (M); Springfield, 31 July, 1892, *Dewart 26* (M); St. François River, Dunklin Co., 20 Aug., 1897, *Trelease 514* (M); Gascondy, 21 July, 1914, *Emig 235* (M); Tunnell Hill, Johnson Co., 4 Oct., 1919, *E. J. Palmer 16685* (M).

Missouri: Jackson Co., 3 Aug., 1893, *Bush* (M); Neeleyville, 8 Aug., 1894, *Eggert* (M); Jerome, 30 Aug., 1913, *Kellogg 133* (M); Forest Park, St. Louis, 30 Aug., 1878, *Eggert* (M); near Suspension Bridge, Forest Park, St. Louis, 6 Sept., 1889, *Trelease* (M); along branches of creeks, Greenwood, 28 Oct., 1915, *Bush 2911* (M); Wayne City, 28 Sept., 1895, *Mackenzie 295* (M); Raytown, 7 Aug., 1895, *Mackenzie 292* (M); Kansas City, 24 July, 1895, *Mackenzie 289* (M); Poplar Bluff, 7 Aug., 1892, *Dewart 7* (M); low ground, Oakwood, 6 Aug., 1914, *Davis 3342* (M); wet places, Noel, 13 Oct., 1908, *Bush 5283* (M); Noel, McDonald Co., 1 Sept., 1913, *E. J. Palmer 4044* (M); Webb City, Jasper Co., 20 Aug., 1906, *E. J. Palmer 951* (M); common in low ground, Lakeside Park, Jasper Co., 27

Sept., 1908, *E. J. Palmer 1550* (M); Carthage, 25 Aug., 1907, *E. J. Palmer 1075* (M); Bismark, Iron Mt., 17 Aug., 1897, *Trelease 515* (M); Terre Blene Creek, St. Genevieve Co., 14 Oct., 1897, *Trelease 507* (M); Bridgeton, 22 July, 1859, *Fritchey* (M); Swan, 1 Oct., 1899, *Bush 722* (M); wet ground, Galena, Stone Co., 14 Oct., 1913, *E. J. Palmer 4663* (M); Warsaw, Benton Co., 26 Aug., 1897, *Trelease 516* (M); Big River, Jefferson Co., 23 July, 1885, *Wislizenus 266* (M).

Arkansas: Fulton, 18 Sept., 1900, *Bush 921* (M); Little Buffalo, Hanly, Shary Co., Aug., 1913, *Emig 69* (M); Bradley's Ferry, 27 July, 1913, *Emig 19* (M); Springtown, Benton Co., 1 Aug., 1913, *Emig 176* (M); Little Rock, July, 1886, *Hasse* (Stanford).

Kansas: wet soil, Doniphan Co., 31 July, 1897, *Whitford 1081* (M); St. George, 27 Sept., 1892, *Carleton* (M); Ward, 1890, *Darnell 49* (Ore.).

Oklahoma: on wet creek bank near Pawhuska, Osage Co., 9 Aug., 1913, *Stevens 2003½* (M and Stanford); Tishomingo, Johnston Co., 10 Sept., 1914, *E. J. Palmer 6488* (M).

Indian Territory: Sapulpa, 22 July, 1894, *Bush 405* (M).

Texas: sandy swamps, San Augustine, 8 Sept., 1916, *E. J. Palmer 10648* (M).

Mississippi: Oktibbeka Co., 11–17 Aug., 1896, *Pollard 1323* (M and Cornell); wet places, Panola Co., 17 Sept., 1896, *Eggert* (M); Taylorville, 21 Aug., 1903, *Tracy 8711* (M).

Louisiana: Monroe, 15 Oct., 1915, *E. J. Palmer 8942* (M).

Alabama: Tensaw, 18 Aug., 1904, *Tracy 8011* (Cornell and M).

This species and *M. ringens* are the common blue-flowered *Mimuli* of the eastern states. The floral structure of both of them is remarkably constant when compared with the western species. *M. alatus* differs from *M. ringens* mostly in the length of the pedicels and in having petioled leaves.

3. **M. gracilis** R. Br. Prodr. 439. 1810, and 123. 1821; Benth. Scroph. Ind. 29. 1835; DC. Prodr. **10**: 369, 594. 1846; Benth. & Mueller, Fl. Austr. **4**: 482. 1869; Mueller, Frag. **6**: 103. 1867–68; Hook. Fl. Brit. Ind. **4**: 259. 1884; Moore, Fl. New South Wales, 337. 1893.

M. strictus Benth. in Wall. Cat. no. 3918. 1828; Scroph. Ind. 28. 1835; G. Don, Hist. Dichlam. Pl. **3**: 553. 1838.

M. striatus Walp. Rep. **3**: 275. 1844–45, *sphalm* (for *strictus*).

M. pusillus Benth. in DC. Prodr. **10**: 369. 1846.

M. angustifolius Hochst. ex A. Rich, Tent. Fl. Abyss. **2**: 119. 1851; Walp. Ann. **3**: 192. 1852–53; Kuntze, Rev. Gen. Pl. **3**: 236. 1893.

A slender glabrous perennial, rhizome creeping; stem erect, 1.5–3 dm. high, simple or branched from near the base, quadrangular, the angles winged; leaves linear-oblong or lanceolate, obtuse, .8–5 cm. long, 1–10 mm. broad, 1-nerved, sessile, clasping at the broad base or subauriculate, entire or occasionally denticulate; flowers in a loose raceme, pedicels elongated, 3 or more times the length of the corolla; calyx tubular, much distended by the mature capsule, 6–7 mm. long, ribs more or less purplish, teeth equal or nearly so, short, deltoid-lanceolate, sinuses broad, scarious, sometimes cleft; corolla 1.2–1.5 cm. long, blue or violet-purple, occasionally white or pink, tube and throat broad, exserted, lobes broad, nearly truncate, minutely ciliate, upper lip erect and much shorter than the spreading lower lip, throat nearly closed by the prominent hairy palate; stamens glabrous, included, filaments thickened along the lower part; style glabrous, included, with a persistent tubercular enlargement at the base, stigma-lobes equal, broadly rounded, laciniate; capsule included, oblong; seeds oblong, reticulate.

Distribution: in wet places in Australia, India, and South Africa.

Specimens examined:

India: Chota Nagpur, Feb., 1903, *Prain 71* (Pomona); Lodh, Kumaon, 5000 ft. alt., without date, *Strachey & Winterbottom* (G); Changhes, Kashmir, 1 July, 1876, *Clarke 496* (U. S.); Punjab, 1000 ft. alt., without date, *Thomson* (G); in rice fields, Manneri, Himalaya Mts., 5000 ft. alt., 4 June, 1920, *Dudgeon & Kenoyer 141* (M).

Abyssinia: Bahara, Province Sana, 5 Aug., 1841, *Hochstetter 1629* (M).

South Africa: Maputa, 1 Oct., 1909, *Howard 22* (U. S.); south coast of Africa, 9 Oct., without year, *Ecklon* (M); by the Kachu (Yellowwood) River, without date, *Dregè* (M); N. Tondweni, Zululand, 12 May, 1903, *Wood 9193* (U. S.); near

Weenen, Natal, 4500 ft. alt., Dec., 1890, *Wood 1506* (G); Ladysmith, Natal, 18 March, 1894, *Kuntze* (U. S.).

Australia:

New South Wales: Gerilderie, Oct., 1920 *Dwyer* (Wellesley); Mudgee, without date, *Woolls* (G).

Victoria: Lower Loddon, without date, *Mueller* (G); Lower Loddon, without date, *Walter* (M); Swan Hill District, Oct., 1888, *French* (G).

4. **M. madagascariensis** Benth. in DC. Prodr. **10**: 369. 1846.

A tall glabrous perennial; stems erect; leaves few, broadly ovate, obtuse, 1.5–2 cm. long, 8–12 mm. wide, sessile, irregularly dentate, 3-nerved from the broad, clasping base; pedicels stout, longer than the leaves; calyx narrowly cylindrical, 6–7 mm. long, distended by the mature capsule, teeth equal, short, lanceolate-acute; corolla blue, 12–14 mm. long, tube exserted, throat densely bearded on the lower side, partly closed by the prominent palate, upper lip shorter than the lower, margins densely ciliate; stamens and style included; capsule broadly oblong, obtuse; seeds oblong.

Distribution: found only on the Island of Madagascar.

Specimens examined:

Madagascar: Madagascar, without date, *Shufeldt 116* (U. S.); Madagascar, without date, *Lyall* (M, photograph of the type).

This species has the general aspect of *M. gracilis*, differing mainly in having broad, 3-nerved, dentate leaves.

5. **M. linearis** (R. Br.) Wettst. in Engl. & Prantl, Nat. Pflanzenfam. 4^{3b}: 72. 1891.

Uvedalia linearis R. Br. Prodr. 440. 1810, and 124. 1821; G. Don, Hist. Dichlam. Pl. **4**: 555. 1838.

M. Uvedaliae Benth. in DC. Prodr. **10**: 369. 1846; Mueller, Frag. **6**: 103. 1867–68; Benth. & Mueller, Fl. Austr. **4**: 482. 1869; Banks & Solander, Botany Cook's Exp. **2**: 66, *pl. 217.* 1901; Bailey, Fl. Queensland **4**: 1102. 1901.

A small glabrous plant, apparently annual; stem weak, slender, simple or branched, leaves few, linear-lanceolate, 4–12 mm. long, acute, 1-nerved, entire, sessile, internodes elongated; pedicels slender, axillary, 3 or more times the length of the corolla, flowering from near the base; calyx narrowly tubular, arcuate, 4–5 mm. long, teeth very small, triangular-acute, nearly equal, ciliate; corolla 8–10 mm. long, blue or violet, tube white, slightly exserted, throat blue with 2 yellow oblong patches, these white-margined and dotted with red below the lower lip, palate prominent, upper lip longer than the lower one; style and stamens much exserted, stigma-lobes equal; capsule included, oblong, acute, the valves splitting readily.

Distribution: wet places in northern Australia and in Queensland.

Specimens examined:

Australia: North Australia at Pt. Darwin, without date, *Forsythe* (Calif. Acad.).

5a. Var. **lutea** Benth. in Benth. & Mueller, Fl. Austr. **4**: 482. 1869.

M. debilis Mueller in Trans. Phil. Inst. Vict. **3**: 62. 1859; Frag. **6**: 103. 1867–68.

Corolla yellow within, paler outside, throat spotted with red; filaments ciliate.

Distribution: northern Australia.

SECTION 2. ERYTHRANTHE Greene

§2. ERYTHRANTHE Greene in Bull. Calif. Acad. Sci. **1**: 108. 1885.

Eumimulus Gray, Syn. Fl. N. Am. **2**^{1}: 276. 1878, ed. 2, and Suppl. 446. 1886, as to *M. cardinalis*.

Perennial from running rootstocks or from stolons, glandular, viscid-pubescent or viscid-villous; stems mostly terete, stout, and erect; leaves sessile, 3–5-nerved from the base; flowers few, usually terminal; calyx prismatic, strongly angled, not inflated at maturity, teeth equal or unequal; corolla red, bilabiate; stamens exserted, anthers bearded, filaments inflated at the point of insertion; stigma-lips equal, bilamellate; capsule membranaceous, about half as long as the calyx, dehiscent to the base along both sutures, placentae slightly separated at the apex. Sp. 6–9.

KEY TO THE SPECIES

A. Calyx-teeth equal; style exserted.
  a. Corolla-tube little longer than the calyx..................*6. M. cardinalis*
  b. Corolla-tube much longer than the calyx.
    α. Pedicels shorter than the leaves; stems mostly prostrate..*7. M. rupestris*
    β. Pedicels longer than the leaves; stems erect..........*8. M. verbenaceus*
B. Calyx-teeth unequal; style included.........................*9. M. Nelsonii*

6. M. cardinalis Dougl. in Benth. Scroph. Ind. 28. 1835; Benth. in DC. Prodr. **10**: 370. 1846; D. Don in Brit. Flower Gard. **4**: *pl. 358.* 1836; Gray in Proc. Am. Acad. **11**: 98. 1876; Bot. Calif. **1**: 566. 1876; Syn. Fl. N. Am. **2**^{1}: 276. 1878, and ed. 2, 1886; Greene in Bull. Calif. Acad. Sci. **1**: 108. 1885; Manual Bay Region, 276. 1894; Conzatti & Smith, Fl. Sin. Mex. 117. 1897; Jepson, Fl. W. Mid. Calif. 405. 1901, and ed. 2, 378. 1911; Howell, Fl. Northwest Am. 519. 1901; Eastwood, Fl. South Fork King's River, Sierra Club Publ. 27: 64. 1902; Abrams, Fl. Los Angeles, 365. 1904, and ed. 2, 336. 1917; Hall, Yosemite Fl. 222. 1912.

Erythranthe cardinalis Spach, Hist. Nat. Veg. Phaner. **9**: 313. 1840.

Diplacus cardinalis Grönland in Rev. Hort. IV. **6**: 137. 1857.

M. cardinalis var. *rigens* Greene, Leafl. Bot. Obs. & Crit. **2**: 2. 1909.

M. cardinalis var. *griseus* Greene, Leafl. Bot. Obs. & Crit. **2**: 2. 1909.

M. cardinalis var. *exsul* Greene, Leafl. Bot. Obs. & Crit. **2**: 2. 1909.

A freely branching perennial, villous throughout and more or less viscid; stems 2.5–3 dm. long, from a running rootstock, hollow, erect and more or less rigid to weak and somewhat procumbent, or occasionally climbing over low shrubs; leaves obovate or oblong, 2–11 cm. long, 1–4 cm. wide, sessile by a broad base, auriculate, yellowish-green, frequently almost hoary, 3–5-nerved from the base, thin, margins regularly or irregularly serrate, teeth salient and often with a smaller tooth between the indentations; pedicels stout, longer than the leaves; calyx tubular or oblong-prismatic, 1.8–2.5 cm. long, often finely dotted with red, the ribs more or less tinged with red, teeth 4–5 mm. long, equal, broadly ovate, acute or acuminate, ciliate; corolla strongly bilabiate, 4–5 cm. long, varying in color from brilliant scarlet to pale reddish-yellow, rarely yellow, broadly cylindrical, tube mostly slightly exserted, orange, striped with red, lobes emarginate, the upper lip erect with the lobes turned back, the middle lobe of the lower lip spreading, the lateral ones strongly reflexed, ciliate at the sinuses; stamens much exserted and partly enclosed by the upper lip, filaments glabrous, anthers yellow, densely villous with soft, white, flat hairs; style longer than the stamens, stigma lips oblong, ciliate; capsule included, oblong, acuminate; seeds oblong, reticulate.

Distribution: common in shaded places along streams from Utah and Arizona, west to Oregon and Lower California.

Specimens examined:

Arizona: Chaperon Canyon, Chiricahua Mts., 7300 ft. alt., 1 July, 1907, *Blumer 1551* (M and Stanford); near Soldier's Camp, Santa Catalina Mts., 13 July, 1916, *Harris C16295* (U. S.); Mt. Graham, 9250 ft. alt., Aug., 1874, *Rothrock 401* (G); southeastern Arizona, 1894, *Price* (Stanford); Mt. Lemmon, Santa Catalina Mts., 2 Aug., 1916, *Harris C16440* (M); Santa Catalina Mts., Pima Co., 8000–10000 ft. alt., June, 1891, *Rhoads* (Phil.); Fort Grant, Pinaleno Mts., Graham Co., 16 July, 1917, *Munz 1207* (Cornell and Pomona).

Nevada: Eagle Valley, Ormsby Co., 19 July, 1902, *C. F. Baker 1336* (M, R. Mt., and Pomona).

Oregon: Rogue River, Jackson Co., 7 July, 1892, *Hammond 310* (M); Deer Creek Valley, Josephine Co., 4–16 July, 1919, *Dale* (Stanford); Brookings, Curry Co., May, 1915, *Thompson 209* (Stanford); Snow Camp, Curry Co., 4000–4250 ft. alt., July, 1916, *J. H. Thompson 26* (Stanford); Grant's Pass, 24 May, 1884, *Howell 382* (Phil. and Ore.); Grant's Pass, 31 Aug., 1889, *Munson & Hopkins* (U. S.).

California: Big River, Mendocino Co., July, 1903, *McMurphy 295* (Stanford); Mendocino, Aug., 1898, *H. E. Brown 865* (M, Phil., Cornell, and R. Mt.); Fort Bragg, 1914, *Mathews 177* (Calif.); Shasta Co., 1896, *Stone* (M); Dutch Flat, Placer Co., July, 1900, *Cole* (R. Mt.); marshy soil in oak grove, Phillips Ranch, Colusa Co., 9 July, 1916, *Stinchfield 417* (Stanford);

Colby, Butte Co., Aug., 1896, *Bruce 859* (M); De Sabla, Butte Co., 6 June, 1917, *Edwards* (Stanford); Agricultural Station, Amador Co., July, 1891, *Hansen 134* (M and Stanford); wet ditch, Plymouth, Amador Co., 26 June, 1903, *Gross 23* (Stanford); Big Tree Grove, 1873, *Lemmon* (Phil.); San Antonio Creek, below the Falls, Calaveras Co., 24 Aug., 1906, *Dudley* (Stanford); Washington Flat, Calaveras Co., 5 Aug., 1890, *Jepson 26m* (Calif.); Spring Gulch, vicinity of Rawhide, Tuolumne Co., 31 July, 1915, *Stinchfield 14* (Stanford); near Yosemite, 9 Aug., 1891, *Coville & Funston 1855* (Cornell); Mariposa, 27 Sept., 1903, *Congdon* (M); Stockton Creek, Mariposa Co., 10 Aug., 1892, *Congdon* (Stanford); trail to Yosemite Point, Yosemite Valley, 2 June, 1894, *Burnham* (Cornell); trail from Huntington Lake to Cascada, Fresno Co., 6 July, 1918, *A. L. Grant 1397* (M); South Fork Kaweah River, Tulare Co., 22 July, 1904, *Culbertson,* distributed as *C. F. Baker 4291* (M and Pomona); Colony Spring, Tulare Co., Aug., 1900, *Dudley 3340* (Stanford); Simpson Meadow, Middle Fork King's River, July, 1913, *Eliot* (Calif.); King's Canyon Road, west of Carson, 31 Aug., 1901, *Steinmetz* (Stanford); near Bartlett Springs, Lake Co., Aug., 1916, *A. S. Stinchfield* (Stanford); Rockville, Solano Co., 1 Aug., 1880, *Earle* (M); mts. near Napa, 13 Aug., 1874, *Parry 353* (M); Weldon Cañon, Solano Co., 13 Sept., 1891, *Jepson* (Calif.); Adobe Cañon, Sonoma Co., June, 1893, *Michener & Bioletti* (Pomona); Sebastapol, Sonoma Co., 12 July, 1907, *Dows* (Stanford); Sausalito, 12 Aug., 1872, *Redfield 6103* (M); San Pablo, July, 1896, *King* (Pomona); banks of creeks, San Francisco, 1865, *Bolander* (M); Redwood Canyon, near Oakland, 11 Sept., 1915, *Abrams 5485* (Stanford); Oakland Hills, 1865, *Bolander 96* (M); Lake San Andreas, San Mateo Co., July, 1903, *Elmer 4941* (M, Stanford, and Pomona); Wright's, Santa Clara Co., July, 1885, *Rattan* (Stanford); Los Gatos Creek, 18 June, 1891, *McCormick & Hammond* (Ore.); Swanton, Santa Cruz Co., 6 June, 1912, *Rich* (Stanford); Carmel Bay, Sept., 1902, *Elmer 4056* (Stanford); Tassajara Hot Springs, June, 1901, *Elmer 3359* (M and Stanford); wet ground, by road below Bisses Station, Kern Co., 27 June, 1895, *Dudley 430* (Stanford); north of San Luis Obispo, June, 1881, *Rattan* (Stanford); Friar's Harbor, Santa Cruz Island, 29 July, 1923, *A. L. Grant 1701* and *1702* (Calif.); Santa Barbara, 1874, *Monks 6* (Phil.); Ojai Valley, Ventura Co., 1 July, 1915, *Thacher 56* (Calif.); Friar's Harbor, Santa Cruz Island, 3 Sept., 1903, *J. Grinnell 8* (Stanford); Avalon, Santa Catalina Island, Aug., 1896, *Trask* (M); Santa Catalina Island, 21–26 April, 1904, *Grant & Wheeler 6143* (M and R. Mt.); cañons, Sierra Santa Monica, April, 1889, *Hasse* (M); Sturtevant's Camp, Mt. Wilson, 25 July, 1901, *G. B. Grant 4454* (Stanford); Rock Creek, desert slopes of the San Gabriel Mts., 3800 ft. alt., 2–4 July, 1908, *Abrams & McGregor 530* (Stanford); Russell's Lake, Los Angeles Co., 18 July, 1913, *Abrams 5017* (Stanford); Pocoima Canyon, 28 July, 1918, *Hitchcock 24* (Pomona); Live Oak Cañon, Claremont, 16 July, 1915, *Crawford* (M and Pomona); San Antonio Cañon, San Antonio Mts., 8000 ft. alt., 28 July, 1917, *I. M. Johnston 1524* (M and Stanford); San Antonio Cañon, near Claremont, 2 Aug., 1903, *C. F. Baker 3457* (M and Pomona); in dense masses about springs, Icehouse Cañon, San Antonio Mts., 6500 ft. alt., 16 June, 1918, *Parish 11980* (M); Little Santa Anita Canyon, Los Angeles Co., 1 July, 1902, *Abrams 2616* (M and Stanford); Sandy Creek bank, Verdugo Cañon, Los Angeles Co., 25 June, 1915, *Macbride & Payson 750* (R. Mt.); Buckhorn Cañon, San Gabriel Mts., 30 Aug., 1917, *F. Grinnell, Jr.* (Stanford); Fall Creek, San Bernardino Mts., 7 Sept., 1915, *Gardner 531* (M and Pomona); stream banks, San Bernardino Co., July, 1890, *Parish* (M); vicinity of San Bernardino, 1000–1500 ft. alt., 10 July, 1896, *Parish 4189* (M); river banks, Victorville, 25 June, 1915, *Parish 10544* (Stanford); borders of streams, San Bernardino Mts., 1882, *Parish & Parish 119* (Stanford); Strawberry Valley, San Jacinto Mts., 5200 ft. alt., July, 1901, *Hall 2382* (M and Stanford); Jamul Valley, San Diego Co., 2 July, 1894, *Schoenfeldt 3835* (Stanford); Jamul Valley, 1500 ft. alt., June, 1895, *Stokes* (Stanford); Alpine, San Diego Co., 6 Aug., 1894, *Mearns 3948* (Stanford); Alpine, San Diego Co., 14 Aug., 1894, *Mearns 4030* (Stanford); mountains of San Diego Co., 25 July, 1882, *H. C. Orcutt 132* (M); San Diego, 1874, *Cleveland* (M); Fort Tejon, 1857–58, *de Vesey 65* (Phil.); California, *Douglas* (G).

Mexico:

Lower California: San Pedro Martir, Aug., 1903, *Robertson 26* (Calif.); Tecate River, near Monument 245, 23 June, 1894, *Schoenfeldt 3762* (Stanford); Socorro, 27 April, 1886, *Orcutt* (M); Cedros Island, July–Oct., 1896, *Anthony 39* (Phil., M, and Stanford); Santa Tomas, northern Lower California, 17 July, 1885, *Orcutt* (Calif).

The corollas of the specimens of *A. L. Grant 1702* are deep canary-yellow with three red stripes down the throat below the lower lip. The specimens of Orcutt from Santa Tomas are also labeled "yellow flowers."

7. **M. rupestris** Greene, Leafl. Bot. Obs. & Crit. **2**: 3. 1909.

Stems mostly prostrate and frequently rooting at the nodes, the whole plant viscid-villous; leaves numerous, oblong or elliptical, 2–5 cm. long, .8–2.2 cm. wide, broadly sessile, 3-nerved from the base, saliently and coarsely toothed along the upper half; pedicels slender, somewhat quadrangular, shorter than the leaves; calyx cylindrical, 1.8–2 cm. long, teeth equal, triangular-acute, 4–5 mm. long, ciliate; corolla 4–5 cm. long, scarlet, more or less tinged with yellow, the tube slender, funnelform, more than twice as long as the calyx, throat ampliate, upper lip erect and longer than the spreading lower one; anthers hispid, horseshoe-shaped; style about as long as the corolla, stigma-lips long-oblong; capsule oblong; seeds oblong, apiculate at each end, favose-pitted.

Distribution: known only from the type locality.

Specimens examined:

Mexico:

Morelos: wet cliffs, Sierra de Tepoxtlan, 7500 ft. alt., 6 May, 1900, *Pringle 8348* (U. S., TYPE, Phil., and Pomona).

8. **M. verbenaceus** Greene, Leafl. Bot. Obs. & Crit. **2**: 2. 1909.

M. lugens Greene, Leafl. Bot. Obs. & Crit. **2**: 3. 1909.

Upright stems from a creeping rootstock, simple or branched, more or less quadrangular, villous or pubescent with some glandular hairs; leaves elliptical, obovate, rhombic-ovate or occasionally spatulate, 5–7.5 cm. long, 1.5–3 cm. wide, saliently and coarsely toothed above the middle, the serrations sometimes continuing to the broad, frequently subcordate sessile base, 3–5-nerved from the base, the upper surface occasionally marked with a broad, irregular, somewhat triangular reddish-brown band; pedicels slender, quadrangular, 7–10 cm. long, generally exceeding the subtending leaves; calyx prismatic, 2–2.8 cm. long, more or less white-villous at the base and often tinged or shaded with red, teeth equal, broadly deltoid-subulate, 5–6 mm. long; corolla 3.5–5.5 cm. long, rarely obscurely bilabiate, crimson, often tinged with yellow, the tube much exserted, broadly funnelform, throat ampliate, lobes nearly equal, frequently emarginate and more or less truncate, the upper lip erect, the lower lip somewhat spreading; stamens much exserted, style about as long as the corolla, stigma-lips oblong, rounded; capsule oblong; seeds oblong, longitudinally wrinkled.

Distribution: north-central and southern Arizona to northern Mexico.

Specimens examined:

Arizona: Shinamo Creek, Grand Canyon, 21–26 Oct., 1906, *Pilsby* (Phil.); Bright Angel Trail, Grand Canyon, without date, *Shockley* (Stanford); Clear Creek, central Arizona, 14 Aug., 1891, *McDougal* (U. S.); crevices in perpendicular walls of the canyon where water drips out, Clear Creek, Camp Verede, 9 Aug., 1891, *Toumey* (U. S., TYPE); Hermit Cave, Grand Canyon, 8 May, 1922, *Wiegand & Upton* (Cornell); along swift streams, Ramsey Cañon, Huachuca Mts., 10 June, 1909, *Goodding 135* (G and R. Mt.); edge of creeks and under overhanging rocks, Ramsey Cañon, Huachuca Mts., 20 Aug., 1910, *Goodding 739* (G and R. Mt.); Huachuca Mts., 29 June–5 July, 1903, *Griffiths 4815* (U.S. and M); Huachuca Mts., 5 June, 1897, *Breninger* (G); Fort Huachuca, 1890, *Patzky* (U. S.); shady river banks, Rio Verde, 10 Oct., 1865, *Coues & Palmer 596* (M); Fort Huachuca, 26 April–21 May, 1890, *Edw. Palmer 441* (G); near Fort Huachuca, 1894, *Wilcox 119* (U. S.).

Mexico:

Chihuahua: Guayanopa Canyon, Sierra Madre Mts., 3600 ft. alt., 24 Sept., 1903, *Jones* (Pomona).

Sinaloa: Sierra de los Alamos, 25 March–8 April, 1890, *Edw. Palmer 328* (U. S.); high up in the Sierra de Alamos, 19 March, 1910, *Rose, Standley & Russell 13074* (U. S.); sandy soil along the river, near Fuerte, Sinaloa, 27 March, 1910, *Rose, Standley & Russell 13381* (U. S.).

9. M. Nelsonii Grant[1]

Stems more or less quadrangular, viscid-villous, erect and branched or somewhat procumbent; leaves elliptical or ovate-lanceolate, 3–8 cm. long, .7–2 cm. wide, saliently toothed, sessile by a broad subcordate base, sparingly pubescent, 3-veined from the base; pedicels quadrangular, longer than the leaves; calyx broadly cylindrical, 3.4–3.7 cm. long, pubescent, teeth unequal, triangular-acute, about one-third as long as the tube, the throat oblique; corolla 5–6.5 cm. long, crimson, more or less shaded with yellow, the tube cylindrical, much exserted, throat ampliate, sparingly pubescent within, lobes of the upper lip longer, erect, almost truncate, those of the lower lip shorter and spreading, slightly emarginate; stamens exserted, attached near the base of the tube, filaments thin, broad, anthers horseshoe-shaped, villous; style included, shorter than the calyx, glabrous, stigma-lips truncate, slightly erose; capsule unknown.

Distribution: known only from the type locality.

Specimens examined:

Mexico:

Durango: Sierra Madre, 30 miles north of Guanaceri, 8000–9000 ft. alt., 18 Aug., 1898, *Nelson 4775* (U. S. Nat. Herb., TYPE).

M. Nelsonii is unique in this section on account of its unequal calyx-teeth and its short style.

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[1] **Mimulus Nelsonii** Grant, sp. nov., caulis ramique viscoso-villosi; foliis ellipticis ovatis lanceolatisve, dentatis, sessilibus, 3–8 cm. longis; calyce late cylindrato, 3.4–3.7 cm. longo, pubescente, dentibus inaequalibus, ore obliquo; corolla 5–6.5 cm. longa, coccinea, tubo multo exserto, lobis inaequalibus; staminibus exsertis, antheris villosis; stylo calyce breviore.—Collected at Sierra Madre, 30 miles north of Guanaceri, Durango, 8000–9000 ft. alt., 18 Aug., 1898, *E. W. Nelson 4775* (U. S. Nat. Herb., no. 332825, TYPE).

SECTION 3. SIMIOLUS Greene

§3. SIMIOLUS Greene in Bull. Calif. Acad. Sci. **1**: 109. 1885, in part.

Annuals or perennials, glabrous or pubescent; leaves variable; calyx becoming inflated at maturity and loosely investing the membranaceous capsule, teeth unequal, the lower usually curved upwards over the lateral teeth, partly or nearly closing the orifice; corolla distinctly bilabiate with two prominent hairy ridges below the lower lip, these sometimes almost closing the throat; stamens included, glabrous; style glabrous or puberulent, included; capsule dehiscent to the base along both sutures, placentae completely united. Sp. 10–25.

KEY TO THE SPECIES

A. Corolla-throat open; flowers axillary, in a loose few-flowered raceme or solitary; stems low, mostly creeping or procumbent.
a. Calyx-teeth 5.
α. Corolla more than 2.5 cm. long.
I. Leaves in a basal rosette..........................*12. M. acaulis*
II. Leaves mostly cauline.
1. Leaves broadly ovate or rounded, 5–7-nerved; corolla yellow, sometimes with red or pinkish-purple spots..........*10. M. luteus*
2. Leaves subrhombic-ovate or elliptical, mostly 3–5-nerved; corolla copper-colored when mature............*11. M. cupreus*
β. Corolla less than 2.5 cm. long.
I. Leaves mostly suborbicular, more or less covered with short stiff, white hairs; corolla laciniately lobed or erose..*21. M. dentilobus*
II. Leaves broadly ovate to suborbicular, glabrous or nearly so; corolla-lobes mostly entire.
1. Stems glabrous or nearly so.
* Leaves radical; flowers subsessile..............*23. M. depressus*
** Leaves mostly cauline; pedicels longer or shorter than the leaves..............................*25. M. glabratus*
2. Stems not glabrous.
* Stems erect, glandular-villous..................*19. M. Whipplei*
** Stems prostrate, densely pubescent.
† Leaves sessile or short-petioled.
‡ Whole plant pubescent................*24. M. pilosiusculus*
‡‡ Upper part of stems pubescent...*25a. M. glabratus* var. *parviflorus*
†† Leaves long-petioled........................*22. M. crinitus*
b. Calyx-teeth 3....................................*20. M. pallens*
B. Corolla-throat partly or nearly closed by the prominent palate; flowers commonly numerous in a definite raceme, sometimes few-flowered.
a. Upper calyx-tooth rarely more than twice the length of the others, the lower teeth in maturity usually folding over and partly closing the orifice.

α. Upper leaves glaucous or pubescent, conspicuously connate-perfoliate.......................................*15. M. glaucescens*
β. Upper leaves not glaucous nor pubescent, seldom connate.
  I. Leaves dentate or denticulate, occasionally lyrate.
    1. Leaves broadly ovate, oblong, elliptical, or rounded.
      * Flowers mostly in definite racemes; pedicels usually shorter than the corollas; rootstocks rarely fleshy or yellow..*14. M. guttatus*
      ** Stems mostly 1–3, rarely 5-flowered, coming from a mass of fleshy, yellowish rootstocks; pedicels usually longer than the corollas...............................*13. M. Tilingi*
    2. Leaves narrowly spatulate or oblanceolate, the upper mostly linear.......................................*16. M. nudatus*
  II. Leaves pinnately lobed, cut, or parted...............*18. M. laciniatus*
b. Upper calyx-tooth almost three times the length of the others, the lower teeth in maturity folding over and nearly closing the orifice ....*17. M. nasutus*

10. M. luteus L. Sp. Pl. ed. 2, 884. 1763; Willd. Sp. Pl. **3**: 361. 1800; Lindl. in Bot. Reg. **12**: under *pl. 1030*. 1826; Hook. in Curtis, Bot. Mag. II. **8**: under *pl. 3336*. 1834; Benth. Scroph. Ind. 28. 1835; DC. Prodr. **10**: 370. 1846, in part; Hook. & Arn. Bot. Beechey's Voyage, 40. 1841; Clos in C. Gay, Hist. Chile **5**: 140. 1849; Planchon in Fl. des Serres **9**: 1. 1853–54; Reiche, Fl. Chile **6**^{1}: 60. 1911.

M. luteus subvar. *macrophyllus* Clos in C. Gay, Hist. Chile **5**: 140. 1849; Reiche, Fl. Chile **6**^{1}: 60. 1911.

M. aurantiacus Renjifo, Anal. Univ. Santiago **65**: 301. 1884, not Curtis.

M. luteus var. *aurantiacus* (Renjifo) Reiche, Fl. Chile **6**^{1}: 60. 1911.

A creeping glabrous perennial, freely rooting from the nodes; stem terete, 1–3 dm. long, decumbent or prostrate; leaves numerous, broadly ovate, acute, 2.5–3 cm. long, nearly as broad, regularly serrate, 5–7-nerved from the base, the lower short-petioled, upper sessile, clasping; flowers few, pedicels 3 or more times as long as the calyx, much longer than the subtending leaves; calyx campanulate, 1.5–2 cm. long, teeth triangular-acute, the upper longer; corolla 3–4 cm. long, tube slender, exserted, lobes spreading, middle lobe of the lower lip longer than the others, throat red-maculate; stamens and style glabrous.

Distribution: common along streams and in moist places in Chile.

Specimens examined:

Chile: Chile, without date, *Styles* (Phil.).

The plants of this species are commonly called "placa" in Chile and the more succulent, tender-leaved ones are eaten either as a salad or cooked in soup.

M. luteus was first collected by Father Feuillee along a river bank in Conception, Chile, about 1714. He described and pictured it as "*Gratiola foliis subrotundus, nervosis, floribus luteus,*" and, so far as known, no specimens were made nor seeds sent to Europe. Linnaeus referred to Feuillee's description and plate when he transferred the yellow-flowered plant to the genus *Mimulus* and nothing more was known of it for some time. Langsdorff, early in the next century, sent some seed from Unalaska; plants from these were named *M. guttatus* by Fischer in 1812. De Candolle took up this name in 1813, fully describing the species and noting some of its differences from *M. luteus*. Other botanists, however, did not agree with this view and believed that the plants from North America and those pictured by Feuillee were conspecific. Several years later, seeds were sent from South America by various collectors so that it was possible to distinguish the *M. luteus* of Feuillee from the yellow-flowered North American *Mimulus* that had been confused with it. *M. luteus* resembles *M. guttatus* rather closely, but can be separated from it, in general, by its creeping habit, its fewer flowers with pedicels 3 or more times longer than the calyx, its mostly glabrous condition, and its more open corolla with a relatively narrow tube. The throat in *M. guttatus* is nearly closed by the two hairy ridges running down the lower side, whereas the throat in *M. luteus* is wide open.

This species, like its North American relative, is polymorphic and several varieties and species have been described, dependent on the color and the number and size of the spots, if present, on the lobes of the corolla. More material for study as to differences or intergradations might modify one's concept of the group as a whole, but, after examining the specimens available, it seems best to keep the following as varieties.

10a. Var. **rivularis** Lindl. in Bot. Reg. **12:** *pl. 1030.* 1826; Lodd. in Bot. Cab. **16:** *pl. 1575.* 1829; Hook. in Curtis, Bot. Mag. II. **8:** under *pl. 3336.* 1834.

M. guttatus Reichenb. Icon. Pl. Cult. **3:** *pl. 204.* 1827–30, not DC.

Stems decumbent or ascending; leaves coarsely toothed, more or less tinged and spotted with red; calyx tinged with red; corolla yellow, lobes unequal, almost truncate, a large reddish spot on the middle lobe of the lower lip and numerous small spots down the throat.

Distribution: along streams and in wet places in Chile.

Specimens examined:

Chile: Maipo River, Santiago, about 6000 ft. alt., Jan., 1892, *Kuntze* (U. S.); in a swamp near Schniedeberg, Silesia, without date, *Buck* (M).

10b. Var. **variegatus** (Lodd.) Hook. in Curtis, Bot. Mag. II. **8:** *pl. 3336.* 1834; Lindl. in Bot. Reg. **21:** *pl. 1796.* 1836; C. Gay, Hist. Chile **5:** 140. 1849; Reiche, Fl. Chile **6**^{1}**:** 60. 1911.

M. variegatus Lodd. in Bot. Cab. **19:** *pl. 1872.* 1832; Paxt. Mag. Bot. **1:** *pl. 79.* 1834; Planchon in Fl. des Serres **9:** 2. 1853–54.

M. ocellatus Bert. ex Steud. Nom. ed. 2, 150. 1841.

Stems erect, leaves thin, ovate to oblong, these and the calyx usually tinged with red; corolla pale yellow, the lobes more or less deeply banded with pinkish-purple at the margins, throat spotted with numerous small red dots.

Distribution: known only from Chile and from cultivated specimens.

Specimens examined:

Chile: Quillota, 1829, *Bertero* (M); Chile, without date, *Bertero 1148* (G); in swamps near Aculeo and in Mt. Leona Rancagua, without date, *Bertero 437* (G and M); Chile, without date, *Dr. Styles* (Phil.).

10c. Var. **Youngana** Hook. in Curtis, Bot. Mag. II. **8:** *pl. 3363.* 1834; C. Gay, Hist. Chile **5:** 140. 1849; Reiche, Fl. Chile **6**^{1}**:** 60. 1911.

M. Smithii Lindl. in Bot. Reg. **20**: *pl. 1674.* 1835, not Paxton.

Stems ascending or decumbent; calyx oval, more or less spotted with red; corolla deep yellow, throat dotted with red and each lobe with a large broad reddish spot near the margin.

Distribution: known only from Chile and from specimens cultivated in European gardens.

10d. Var. **nummularis** C. Gay, Hist. Chile **5**: 140. 1849; Reiche, Fl. Chile **6**^{1}: 60. 1911.

M. nummularis C. Gay, Hist. Chile Atl. **1**: *pl. 57.* 1854.

Stems glabrous, 1–2 dm. long, fistulous, decumbent or ascending, rooting freely from the nodes; leaves ovate or elliptical, 1.5–2.5 cm. long, 1–2 cm. wide, acute, coarsely serrate, sessile and clasping or tapering to a short broad petiole, 3–5-nerved; flowers few in a terminal raceme, rarely solitary, pedicels longer or shorter than the subtending leaves, stout, somewhat quadrangular; calyx campanulate, 1.5–2 cm. long, more or less spotted or tinged with red, teeth broadly triangular-acute, the upper larger; corolla 3.5–4.5 cm. long, yellow, tube slender, throat wide open, lobes unequal, upper lip erect, middle lobes of the spreading lower lip with a single large spherical reddish spot near the center and numerous small dots down the throat; capsule stipitate; seeds longitudinally striate.

Distribution: along streams and in swampy places in Chile.

Specimens examined:

Chile: swampy places and brooks near Rio Colorado, in the vicinity of Santiago, 15 Feb., 1902, *Hastings 523* (Cornell and U. S. no. 530408).

10e. Var. **alpinus** Lindl. in Bot. Reg. **12**: under *pl. 1030.* 1826; Hook. in Curtis, Bot. Mag. II. **8**: under *pl. 3336.* 1834.

A coarse, short-stemmed, puberulent perennial; stems 9–15 cm. high, erect; leaves ovate or ovate-lanceolate, 1.5–3 cm. long, .8–1.5 cm. broad, coarsely and irregularly toothed, 5-nerved, generally short-petioled with a broad base, upper leaves sometimes sessile; flowers few, mostly solitary, terminal, pedicels 2 or more times as long as the subtending leaves, usually quadrangular; calyx frequently spotted with red, teeth broadly ovate, the upper one much longer; corolla yellow, throat broadly oblong, lobes little spreading, the lower with a large round reddish spot near its center.

Distribution: known only from specimens collected in the mountains of Argentine Republic. The type was collected by Gillies near Mendoza.

Specimens examined:

Argentine Republic: near La Guardia, Catamarca, 1829, *Gillies* (G); Cieneja de la Cesveyas, Jan., 1829, *Gillies* (G); La Allada, 4 June, 1916, *Jörgensen 1268* (G and M).

Further collections might show that this plant is entitled to specific rank.

11. M. cupreus Dombrain in Fl. Mag. **2:** *pl. 70.* 1862; Regel in Gartenfl. **13:** 3, *pl. 422, fig. 1.* 1864 (amplified description); Reiche, Fl. Chile **6**^{1}: 61. 1911.

M. luteus var. *cuprea* Hook. in Curtis, Bot. Mag. III. **20:** *pl. 5478.* 1864.

A glabrous or puberulent annual, branching freely from the base, more or less dwarfed and somewhat compact; stems terete, 1–2 dm. high; leaves subrhombic-ovate or elliptical, 1.5–3 cm. long, .8–2 cm. wide, sessile or subsessile, 3–5-nerved from the base, irregularly and coarsely serrate; flowers numerous, pedicels mostly shorter than the subtending leaves or sometimes much longer; calyx campanulate, more or less spotted with red, teeth triangular-acute, the upper one longer, broader, obtuse; corolla 2.5–3.5 cm. long, tube yellow, throat expanded, spotted with red below the lower lip, lobes spreading, golden-yellow, becoming a brilliant copper color at maturity; capsule constricted at the base but not stipitate; seeds longitudinally striate.

Distribution: known only from southern Chile.

Specimens examined:

Chile: Santiago, U. S. Expl. Exp., 1838 (G); Province Colchagua, 1862, *Bridges* (or ? *Cuming*) (U. S. no. 259695); Chile, without locality or date, *Gay* (G).

M. cupreus was one of the popular garden plants of the middle 18th century. Seeds of it were collected by a Mr. Pearce in the mountains near Chillan, in southern Chile, and were sent by him to Europe. The original description and illustration were made from cultivated plants.

12. **M. acaulis** Phil. in Anal. Univ. Chile **91**: 112. 1895.

M. depressus var. *acaulis* (Phil.) Reiche, Fl. Chile **6**^{1}: 62. 1911.

Plants small; leaves in a basal rosette, rhomboid, 1.5–1.6 cm. long, 9 mm. broad, short-petioled, upper leaves incise-dentate; pedicels short, 1-flowered; calyx 6 mm. long; corolla 2.8–3 cm. long, lobes nearly equal; stamens and style short.

Distribution: in the Andes in Illapel, Province of Coquimbo, Chile. Locally called "La Polcura."

The shape of the leaves and the short-pedicelled flowers indicate that this species is distinct from *M. luteus*.

13. **M. Tilingi** Regel in Gartenfl. **18**: 321, *pl. 631*. 1869; Greene in Bull. Calif. Acad. Sci. **1**: 110. 1885.

M. Pilingi Regel in Gartenfl. **18**: *pl. 631*. 1869, *sphalm* (for *Tilingi*).

M. luteus var. *alpinus* Gray in Proc. Acad. Phila. 71. 1863, in part, not Lindl.; Proc. Am. Acad. **11**: 98. 1876; Bot. Calif. **1**: 567. 1876, in part; Syn. Fl. N. Am. **2**^{1}: 277. 1878, in part, ed. 2, and Suppl. 448. 1886, in part; Watson in Bot. King's Exp. 224. 1871.

M. Roezli, acc'd. to Gray, Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 448. 1886.

M. implexus Greene in Jour. Bot. **33**: 8. 1895; Piper & Beattie, Fl. Northwest Coast, 325. 1915.

M. minor A. Nels. in Proc. Biol. Soc. Wash. **17**: 178. 1904.

M. implicatus Greene, Leafl. Bot. Obs. & Crit. **1**: 189. 1905.

M. Langsdorfii var. *minor* (A. Nels.) Cockerell in Daniel, Fl. Boulder, Colorado, 213. 1911.

M. Langsdorfii var. *alpinus* (Gray) Piper in Mazama **2**: 99. 1901; Blankinship in Mont. Agr. Coll. Studies **1**: 98. 1905.

Low creeping perennials; stems from a mass of yellowish rootstocks, usually freely branched, 5–20 cm. long, more or less weak, commonly stoloniferous, glabrous or pubescent above; leaves few, cauline, light green, broadly elliptical to broadly ovate, acute or sometimes rounded, the lower generally short-petioled, the upper sessile, rarely connate, 3–5-nerved from the base, irregularly denticulate; flowers few, mostly terminal, pedicels at least 2½ times as long as the mature calyx, ascending, occasionally recurved, slender, puberulent or pubescent; calyx broadly campanulate, 8–14 mm. long, inflated in fruit, generally tinged and thickly dotted with red, teeth broadly ovate, blunt, unequal, the lower ones usually longer than the lateral, the upper at least twice as long as the others, villous at the sinuses; corolla 2–3.5 cm. long, broadly funnelform, the throat densely bearded and dotted with red, the palate prominent, sometimes nearly closing the throat; style about as long as the throat, sparsely puberulent; capsule oblong or oval, constricted at the base or short-stipitate, blunt, about half the length of the calyx; seeds oblong, reticulate.

Distribution: growing in more or less dense clusters along the edges of creeks or in the midst of shallow rivulets in the high mountains from Montana to Colorado, west to British Columbia and southern California.

Specimens examined:

Montana: Granite Park, Glacier National Park, 10 Aug., 1910, *Kirkwood 51* (M, R. Mt., and Pomona).

Colorado: Breckenridge, 1887, *Bereman 761* (M); moist banks at 10700 ft. alt., Mammoth Gulch, James Peak, 12 Aug., 1919, *Munz 3028* (Pomona); Berthoud's Pass, 23 July, 1881, *Engelmann* (M); Arapahoe Pass, 1904, *Andrews 8* (R. Mt.); Boulder, 10 June, 1901, *Wheeler 312* (R. Mt.); Camp Albion, about 11500 ft. alt., 30 Aug., 1901, *Wheeler 372* (R. Mt.).

Idaho: ridges south from Wiessner's Peak, Coeur D'Alene Mts., about 6000 ft. alt., 28 July, 1895, *Leiberg 1394* (M, R. Mt., and Stanford); near Stevens Peak, 3 Aug., 1895, *Leiberg 1446* (M).

Utah: Alta, Aug., 1879, *Jones* (R. Mt.).

Nevada: Mt. Rose, 9650 ft. alt., 24 Aug., 1912, *Heller 9969* (M).

British Columbia: Ryer's Pass, 29 July, 1890, *Macoun* (M).

Oregon: wet granitic soil, Wallowa Mts., Aug., 1907, *Cusick 3115* (M, R. Mt., and Stanford); Wallowa Mts., 7–8000 ft. alt., 9 Aug., 1900, *Cusick 2468* (Cornell, M, R. Mt., and Calif.); Crater Lake, 26 Aug., 1922, *Epling 5555* (Epling).

California: Mt. Stanford, 19 Aug., 1883, *Sonne 266* (Stanford);

ridge above Donner Pass, Nevada Co., 7500 ft. alt., 10 Aug., 1903, *Heller 7137* (M, R. Mt., and Pomona); Summit Station, Aug., 1883, *Greene* (G); Donner Lake, Aug., 1883, *Greene* (G and M); mountains above Coldstream, Placer Co., 8500 ft. alt., 12 July, 1885, *Sonne 266a* (M); ridge northwest of Donner Pass, 13 Aug., 1917, *Heller 12918* (Cornell, M, and Stanford); Summit Meadows west of Donner Pass, 6800 ft. alt., 26 July, 1919, *Heller 13318* (M); Twin Lakes, Alpine Co., 8500 ft. alt., July, 1892, *Hansen 1289* (M and Stanford); summit of Sonora Pass, Tuolumne Co., 10000 ft. alt., 15 Aug., 1915, *A. L. Grant 320* (M); Mt. Lyell, 9000 ft. alt., 16 July, 1909, *Jepson 3355* (Calif.); in shallow streams, base of Mt. Leavitt, Tuolumne Co., 10500 ft. alt., 29 Aug., 1915, *A. L. Grant 423* (G, Cornell, M, R. Mt., and Calif.); Minarets, Madera Co., 9500 ft. alt., 23 Aug., 1918, *A. L. Grant 1579* (Cornell, M., Calif. Acad., Calif., Stanford, and Pomona); Graveyard Meadow near Silver Pass, Fresno Co., 8500 ft. alt., 18 Aug., 1918, *A. L. Grant 1513* (G, Phil., Cornell, M, and Calif.); Mt. Whitney, 15 Aug., 1904, *Culbertson*, distributed as *C. F. Baker 4544* (M and Pomona); Farewell Gap, Tulare Co., 10400 ft. alt., 23–31 July, 1900, *Jepson 1020* (Calif.); brooks near Farewell Gap, 10300 ft. alt., Apr.–Sept., 1897, *Purpus 5243* (M); slopes of Saw Tooth Peak, Tulare Co., 11000–12000 ft. alt., 10 Aug., 1896, *Dudley 1607* (Stanford); Carson Pass, 8200 ft. alt., 23 Aug., 1918, *Jepson 8091* (Calif.); Onion Valley, near Kearsarge Pass, 15–22 July, 1900, *Jepson 904* (Calif.); Mill Creek Falls, 20 June, 1901, *Parish 5063* (U. S.); wet grassy ground, 9500 ft. alt., 2 July, without year, *Crawford* (Pomona).

There has been considerable confusion regarding the exact status of *M. Tilingi.* Regel grew it from seed sent by Dr. Tiling from near Nevada City, California. He first described and pictured it in Gartenflora **18**: 321, *pl. 631.* 1869. In the next volume (**19**: 290, *pl. 665.* 1870), he described and illustrated another plant which he said came from the roots of the first plant during its second year. The two plants are wholly unlike in habit, in the shape of the leaves and in the shape of the calyx. The second plant closely resembles *M. guttatus*, seed of which had been sent to Regel by Dr. Tiling from Alaska, and it would seem that in some way the two had become mixed or that seed of *M. guttatus* had fallen on the soil of the pots in which *M. Tilingi* was growing. This species varies considerably in the size of the flowers and leaves. Generally, it may be distinguished by its low, rather closely branching stems, its elliptical or ovate, acute leaves and by its long-pedicelled, chiefly terminal flowers. The rootstocks usually are yellowish and moniliform, but the same thing is found in apparently typical specimens of *M. guttatus* so that this cannot be used as a distinguishing feature as suggested by Greene.

13a. Var. **caespitosus** (Greene) Grant, comb. nov.

M. Scouleri var. *caespitosus* Greene, Pittonia **2**: 22. 1889.

M. caespitosus Greene in Jour. Bot. **33**: 8. 1895.

M. luteus var. *alpinus* Gray in Proc. Acad. Phila. 71. 1863, not Lindl.; Proc. Am. Acad. **11**: 98. 1876; Bot. Calif. **1**: 567. 1876, in part; Syn. Fl. N. Am. **2**^{1}: 277. 1878, in part, ed. 2, and Suppl. 448. 1886, in part.

M. alpinus (Gray) Piper in Contr. U. S. Nat. Herb. **11**: 510. 1906; Piper & Beattie, Fl. Northwest Coast, 325. 1915.

Stems 3–10 cm. long, reddish, stolons abundant, forming a more or less dense tuft, rootstocks few; leaves ovate or elliptical, 2–10 mm. long, dark grass-green, more or less tinged with red, glabrous or puberulent, entire or irregularly denticulate; flowers terminal and mostly solitary.

Distribution: high mountains from British Columbia to Idaho and Washington, southward to central California.

Specimens examined:

British Columbia: Asulkan Valley, Glacier, 4100–6000 ft. alt., 19 July, 1906, *S. Brown 605* (M); Upper Spillimacheen, 6400 ft. alt., 27 July, 1904, *Heacock 407* (M and R. Mt.); by a rivulet, alpine meadow in the Big Bend district, 6000 ft. alt., 4 Aug., 1905, *Shaw 1094* (M); Mt. Cheam, 15 Aug., 1901, *Fletcher* (M); west of Skagit River, 4 Aug., 1905, *Macoun 76795* (Cornell); Chilliwack Valley, 1 July, 1906, *Spreadborough* (Cornell and M); Skagit River, 11 July, 1905, *Macoun 76796* (Pomona).

Idaho: wet mossy spring, Smoky Mts., Blaine Co., 8000 ft. alt., 13 Aug., 1916, *Macbride & Payson 3752* (M and R. Mt.); wet banks of alpine brook, Bonanza, Custer Co., 7000 ft. alt., 25 July, 1916, *Macbride & Payson 3419* (M and R. Mt.).

Washington: creeping over moss-covered wet rocks, especially where dripping water occurs, North Fork of Bridge Creek, Okanogan Co., Sept., 1897, *Elmer 642* (M and R. Mt.); beds of alpine rivulets, Mt. Rainier, 1892, *Allen 72* (G); moist places, glacial streams, Mt. Tacoma, 5000 ft. alt., 14 July, 1895, *Flett 168* (Cornell); Mt. Rainier, 20 Aug., 1889, *Greene* (Greene, TYPE, and Stanford); Mt. Rainier, 6000 ft. alt., 12 Aug., 1889, *E. C. Smith* (M); brooks, Nisqually Glacier, Mt. Rainier, 21 July, 1907, *Cowles 794* (M); Crater Lake, Mt. Rainier, 20 Aug., 1889, *Greene* (Stanford); Mt. Rainier, 1906, *Carpenter 52* (M); Mt. Tacoma, 1894, *E. Thompson* (Stanford); wet rocks, Mt. Paddo, 6–7000 ft. alt., 30 June, Aug., 1885, *Suksdorf 479* (G); wet rocks and stony stream banks, Mt. Paddo, 5–6000 ft. alt., 30 June–Sept., 1885, *Suksdorf* (M); Mt. Stuart, Kittitas Co., Aug., 1898, *Elmer 1280* (M and Pomona).

California: near Kearsarge Pass, Fresno Co., 11600 ft. alt., *Jepson 868* (Calif.).

13b. Var. **corallinus** (Greene) Grant, comb. nov. Pl. 9, fig. 2.

M. corallinus Greene in Erythrea **4**: 21. 1896.

M. Langsdorfii var. *Tilingi* (Regel) Greene in Jour. Bot. **33**: 8. 1895; Hall in Univ. Calif. Publ. Bot. **1**: 116. 1902.

M. veronicifolius Greene, Leafl. Bot. Obs. & Crit. **2**: 7. 1909.

M. lucens Greene, Leafl. Bot. Obs. & Crit. **2**: 7. 1909.

M. implexus Greene, Piper, Fl. Northwest Coast, 325. 1915, as to the larger plants.

Stems slender, nearly glabrous, 2–4 dm. long, internodes much elongated; leaves few, broadly ovate, oblong or suborbicular, obtuse, coarsely dentate, denticulate or somewhat sinuate, lower with longer petioles than in the species, the upper sessile, often as broad as long; stems 1–3-flowered, the flowers mostly terminal, pedicels slender, at least 2½ times the length of the calyx.

Distribution: in moist places or where water has been standing. Mountains from Wyoming and Colorado to the Pacific Coast States, southward to Lower California.

Specimens examined:

Wyoming: Garfield Peak, 29 July, 1894, *Nelson 688*, in part, (Cornell).

Colorado: Tolland, 9000 ft. alt., 8 July, 1913, *Overholts 10161* (M).

Washington: alpine rivulets, Mt. Paddo, about 7000 ft. alt., 8 Aug., 1885, *Suksdorf 472* (G).

Nevada: divide south of Slide Mt., Washoe Co., 7600 ft. alt., 5 July, 1913, *Heller 10922* (M and Stanford); branch of White's Creek, Washoe Co., 8500 ft. alt., 10 Aug., 1912, *Kennedy 1886* (G and Stanford); Washoe Mts., 25 July, 1895, *Greene* (Greene, TYPE, and N. Y.).

California: south side of Echo Lake, Eldorado Co., 11 Aug., 1916, *Heller 12539* (Cornell, M, and Stanford); Lake Tartarus, Hot Spring Valley, Plumas Co., 6800 ft. alt., 8 June, 1910, *Jepson 4086* (Calif.); along Coldstream, 3 miles above Truckee, Nevada Co., 23 July, 1903, *Heller 7004* (M, R. Mt., and Pomona); southeastern approaches to Castle Peak, Nevada Co., 31 July, 1903, *Heller* (M); summit meadows, west of Donner Pass, Placer Co., 6800 ft. alt., 26 July, 1919, *Heller 13318*, in part (Cornell); trail to Belle Meadow, Tuolumne Co., 12 July, 1915, *Jepson 6479* (Calif.); Tuolumne Grove of Big Trees, Tuolumne Co., 6000 ft. alt., 4 Aug., 1911, *Jepson 4641* (Calif.); Rancheria Mt., east of Hetch-Hetchy, 25 July, 1909, *Jepson 3406* (Calif.); Herring Creek, Tuolumne Co., 5500 ft. alt., 17 July, 1915, *A. L. Grant 112* (M); Sonora Pass Road, Tuolumne Co., 9000 ft. alt., 26 July, 1915, *A. L. Grant 136* (M); Hog Ranch near Hetch-Hetchy Valley, 4700 ft. alt., 16 June, 1917, *A. L. Grant 971* (G, U. S., Phil., Cornell, M, R. Mt., Ore., Calif. Acad., Calif., Stanford, and Pomona); Stubblefield Cañon, Yosemite Park, 8200 ft. alt., 30 July, 1911, *Jepson 4574* (Calif.); near Peregoy Meadow, Mariposa Co., 7000 ft. alt., 21 June, 1918, *A. L. Grant 1294* (Cornell, M, and Calif.); Alder Creek to Peregoy Meadow, Yosemite Park, 2 July, 1911, *Jepson 4334* (Calif.); Parker Pass, Tuolumne Co., 12000 ft. alt., 25 Aug., 1918, *A. L. Grant 1614a* (Cornell and M); along Dana Creek in Dana Meadow, Tuolumne Co., 10000 ft. alt., 25 Aug., 1918, *A. L. Grant 1614* (Cornell, U. S., M, R. Mt., Calif. Acad., Calif., Stanford, and Pomona); Jackass Meadow, Madera Co., 7000 ft. alt., 25 June, 1918, *A. L. Grant 1342* (Cornell, M, and Calif.); Mary's Meadow above Huntington Lake, Fresno Co., 7500 ft. alt., 11 July, 1917, *A. L. Grant 1081* (Cornell and M); Huntington Lake, Fresno Co., 7000 ft. alt., 5 July, 1918, *A. L. Grant 1411* (U. S., M, Calif., and Pomona); Lake of the Lone Indian, Fresno Co., 11000 ft. alt., 19 Aug., 1918, *A. L. Grant 1551* (M and Calif.); Lloyd Meadows to Little Lake, Kern River, 29 June, 1912, *Jepson 4887a* (Calif.); Mt. Goddard, 11100 ft. alt., 24–26 July, 1900, *Hall & Chandler 692* (M); edges of meadows and streamlets, Horse Corral Meadow to Summit Meadow, 7000 ft. alt., 5–15 July, 1900, *Jepson 771* (Calif.); Cottonwood Creek, Inyo Co., 10000 ft. alt., 23 July, 1912, *Jepson 5076* (Calif.); North Fork, Middle Tule, 15 Aug., 1911, *Jepson 4692* (Calif.); High Creek, Mt. San Gorgorio, 9500 ft. alt., 24 July, 1904, *G. B. Grant 6352* (M); San Jacinto Mts., 9000 ft. alt., 22 July, 1897, *H. M. Hall 709* (Stanford); Bluff Lake, San Bernardino Mts., 7400 ft. alt., 21–27 June, 1895, *Parish 3606* (Calif.); South Fork Meadows, Santa Ana Cañon, San Bernardino Mts., 8200 ft. alt., 18 July, 1906, *H. M. Hall 7508* (Pomona); Tamarack Valley, San Jacinto Mts., 9200 ft. alt., July, 1901, *H. M. Hall 2403* (M).

Mexico:

Lower California: San Pedro Martir Mts., 8000 ft. alt., 15 July, 1905, *Goldman 1237* (U. S.).

The variety *corallinus* has the same general range as the species and merges into it through such specimens as *Jepson 4085* and *5076*, *Heller 7004*, *A. L. Grant 1614*, and *Parish 3606*, all from California. Occasional plants resemble rather closely some of the more slender, few-leaved specimens of *M. guttatus* but, in general, the less erect habit, somewhat weaker stems, and the 1 to 3 terminal flowers with no visible tendency toward forming a raceme serve to separate the two.

14. **M. guttatus** DC. Cat. Hort. Monsp. 127. 1813; Fischer in Hort. Gorenk. 25. 1812, *nomen nudum;* Benth. Scroph. Ind. 28. 1835; Hook. Fl. Bor. Am. **2**: 99. 1840; Hook. & Arn. Bot. Beechey's Voyage, 153 and 378. 1841; Planchon in Fl. des Serres **9**: 2. 1853–54; Greene in Bull. Calif. Acad. Sci. **1**:

110. 1885; Britton & Brown, Ill. Fl. **3**: 158, *fig. 3267.* 1898; Britton, Manual, 828. 1901, and ed. 2, 828. 1905; Pennell in Torreya **19**: 148. 1919. Pl. 8, fig. 4.

M. Langsdorfii J. Donn in Sim's Bot. Mag. *pl. 1501.* 1812, in synonymy; J. Donn, Hort. Cantab., ed. 7, 182. 1812, *nomen nudum;* Greene in Jour. Bot. **33**: 6. 1895; Howell, Fl. Northwest Am. 520. 1901; Nelson in Coulter & Nelson, Manual Cent. Rocky Mountains, 453. 1909; Britton & Brown, Ill. Fl., ed. 2, **3**: 190, *fig. 3777.* 1913; Piper & Beattie, Fl. Southeast Wash. and Adj. Idaho, 228. 1914; Piper & Beattie, Fl. Northwest Coast, 325. 1915; Armstrong, Western Wild Flowers, 496. 1915; Rydb. Fl. Rocky Mountains, 778. 1917; Robinson & Fernald in Gray's Manual, ed. 7, 724. 1908.

M. luteus J. Donn in Sim's Bot. Mag. *pl. 1501.* 1812, not L.; Pursh, Fl. Am. Sept. **2**: 426. 1814, not L.; Benth. in DC. Prodr. **10**: 370. 1846, in part; Gray in Bot. Calif. **1**: 567. 1876, in part; Syn. Fl. N. Am. **2**^{1}: 277. 1878, ed. 2 and Suppl. 448. 1886, in part; Wats. in Bot. King's Exp. 223. 1871; Curran in Proc. Calif. Acad. Sci. II. **1**: 263. 1888; Hall, Yosemite Fl. 221. 1912.

M. lyratus Benth. Scroph. Ind. 28. 1835; Hook. & Arn. Bot. Beechey's Voyage, 377. 1841.

M. rivularis Nutt. in Jour. Phila. Acad. Nat. Sci. **7**: 47. 1834, not Donn.

M. Scouleri Hook. Fl. Bor. Am. **2**: 100. 1840; Benth. in DC. Prodr. **10**: 371. 1846; Gray, Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 448. 1886; Greene in Pittonia **2**: 22. 1889; Howell, Fl. Northwest Am. 520. 1901; Piper & Beattie, Fl. Northwest Coast, 325. 1915.

M. luteus var. *gracilis* Gray in Torr. Bot. Mex. Bound. 115. 1859.

M. glabratus var. *ascendens* Gray, Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 448. 1886.

M. guttatus var. *grandis* Greene, Manual Bay Region, 277. 1894.

M. Langsdorfii var. *platyphyllus* Greene in Jour. Bot. **33**: 7. 1895.

M. Langsdorfii var. *argutus* Greene in Jour. Bot. **33**: 7. 1895.

M. Langsdorfii var. *grandis* Greene in Jour. Bot. **33**: 7. 1895; Jepson, Fl. W. Mid. Calif. 407. 1901, and ed. 2, 379. 1911; Abrams, Fl. Los Angeles, 366. 1904, and ed. 2, 336. 1917.

M. Langsdorfii var. *californicum* Jepson, Fl. W. Mid. Calif. 407. 1901, and ed. 2, 379. 1911.

M. Langsdorfii var. *guttatus* Jepson, Fl. W. Mid. Calif. 406. 1901, and ed. 2, 379. 1911.

M. hirsutus Howell, Fl. Northwest Am. 520. 1901.

M. grandiflorus Howell, Fl. Northwest Am. 520. 1901.

M. grandis Heller in Muhl. **1**: 110. 1904.

M. equinus Greene, Leafl. Bot. Obs. & Crit. **1**: 189. 1905.

M. paniculatus Greene, Leafl. Bot. Obs. & Crit. **1**: 190. 1905.

M. prionophyllus Greene, Leafl. Bot. Obs. & Crit. **1**: 190. 1905.

M. clementinus Greene, Leafl. Bot. Obs. & Crit. **2**: 5. 1909.

A glabrous or pubescent plant, annual or perennial by stems rooting at the nodes, by creeping rootstocks or by stolons; stems terete or somewhat 4-angled toward the apex, fistulous, stout and erect or weak and more or less reclining, .5–5.5 dm. high, mostly simple, commonly glabrous and puberulent or pubescent above; leaves variable, mostly rounded-ovate or ovate-oblong, sometimes broadly oblong or oblong-lanceolate, .8–15 cm. long, .6–8 cm. wide, many-nerved, coarsely and irregularly dentate, often with small projections at the base of the blade, occasionally lyrate, basal leaves often spatulate or obovate, the petioles usually much longer than the blade, upper leaves sessile, broadly rounded-ovate or suborbicular; internodes generally longer than the leaves; inflorescence mostly racemose, sometimes solitary or few-flowered, the pedicels thick and less than twice as long as the calyx, rarely slender and elongated; calyx glabrous or pubescent, campanulate, often tinged or dotted with red, 8–17 mm. long, much inflated in fruit, 1–2.5 cm. long, .8–1.5 cm. wide, teeth short, broadly triangular, sometimes mucronate, the upper tooth longer, broadly oblong, obtuse; corolla 1–4 cm. long, throat usually spotted with red, the ridges densely hairy and nearly closing the throat, margins of upper lip reflexed and much shorter than the spreading lower one; style glabrous or puberulent; capsule broadly oblong, constricted at the base or short stipitate; seeds longitudinally striate.

Distribution: common in wet places from Montana to northern Mexico, west to Alaska and California. Adventive in Connecticut and in various parts of Europe and in New Zealand.

Specimens examined:

Montana: Kranich's Grove, St. Helena, July, 1892, *Harz* (M); near Butte, 5500–6000 ft. alt., July, 1893, *Moore* (M); Spanish Creek, 15 July, 1901, *Vogel* (R. Mt.); wet ground, Gallatin River, near Bozeman, 14 July, 1905, *Blankinship 389* (M); near Red Lodge, 25 July, 1893, *Rose 13* (M); Jack Creek Cañon, 7000 ft. alt., 15 July, 1897, *Rydberg & Bessey 4945* (R. Mt.).

Wyoming: Medicine Bow Mts., Lieut. Bryan's Exp., Aug., 1856, *Engelmann* (M); Garfield Peak, 29 July, 1894, *Nelson 688*, in part (M and R. Mt.); Jackson's Hole on Snake River, 6000 ft. alt., 15 June, 1860, *Hayden* (M); Henry's Fork of Snake River, 5400 ft. alt., 18 June, 1860, *Hayden* (M); sunny, moist places, Sherman, 27 July, 1913, *Macbride 2541* (M); springy brooks, head of Middle Fork of Powder River, Big Horn Co., 19 July, 1901, *Goodding 305* (Cornell, M, and R. Mt.); Little Goose Creek, 16 July, 1896, *Nelson 2372* (R. Mt.); vicinity of Big Horn Mt., July–Aug., 1897, *Williams* (R. Mt.); on the wet bank of Trout Lake, 14 July, 1899, *Nelson & Nelson 5841* (R. Mt.); in a bog, Yellowstone River near Junction Butte, 9 July, 1899, *Nelson & Nelson 5748* (Cornell, M, and R. Mt.); North Vermilion Creek, 17 July, 1897, *Nelson 3573* (R. Mt.); swamps at Willits Spring, 28 June, 1909, *Willits 201* (R. Mt.); Centennial Valley, 17 Aug., 1895, *Nelson 1670* (Pomona); rolling plains between Sheridan and Buffalo, 3500–5000 ft. alt., 15 June–15 July, 1900, *Tweedy 3422* (R. Mt.); in a boggy stream, Bird's Eye, 25 June, 1910, *Nelson 9394* (R. Mt.); Laramie Hills, 28 June, 1891, *Buffum 704* (R. Mt.).

Idaho: Henry Lake, Fremont Co., 6000 ft. alt., 14 July, 1920, *Payson & Payson 2018* (Cornell and M); wet sand, Boise, 22 Aug., 1911, *Clark 290* (M and R. Mt.); Elk Creek, Shoshone Co., July, 1900, *Abrams 813* (Pomona); along St. Mary's River, Coeur D'Alene Mts., 26 June, 1895, *Leiberg 1071* (M and R. Mt.); Valley of North Fork of Coeur D'Alene River, 11 Aug., 1895, *Leiberg 1519* (M and R. Mt.); margins of the Blue Lakes, Twin Falls and Shoshone Falls, 25 June, 1911, *Nelson & Macbride 1344* (R. Mt.); sunny springy mountain sides, Squaw Creek, Boise Co., 3500 ft. alt., 8 May, 1911, *Macbride 808* (M); margins of hot sulphur spring bogs, Ketchum and Guyer Hot Springs, 5887 ft. alt., 22 July, 1911, *Nelson & Macbride 1278* (M); near Riverside National Park, 6000 ft. alt., 27 Aug., 1895, *Elrod* (M); Clearwater River, Nez Perces Co., May, 1896, *Heller & Heller* (Pomona); creek bank, Salmon, Lemhi Co., 4500 ft. alt., 26 June, 1920, *Payson & Payson 1791* (Cornell and M); springy places along Snake River Bluffs, 25 May, 1913, *Muenscher 375* (Cornell); wet places, June–July, 1892, *Mulford* (M); moist loam, Silver City, Owyhee Co., 15 July, 1910, *Macbride 403* (M and R. Mt.); in shallow water along river, St. Anthony, 4 July, 1901, *Merrill & Wilcox 819* (R. Mt.); Sawtooth National Forest Reservation, 1910, *Woods* (R. Mt.); wet swamps, Yellowstone National Park, 8000 ft. alt., 15 Aug., 1907, *Essig* (Pomona); sandy stream margin, Boise, 2880 ft. alt., 27 May, 1911, *Clark 26* (M and R. Mt.).

Colorado: Mt. Richtophen, 29 July, 1894, *C. F. Baker* (Pomona); Van Boxle's Ranch above Cimarron, 8000 ft. alt., 10 July, 1901, *C. F. Baker 392* (M, R. Mt., and Pomona); Cameron Pass, 10000 ft. alt., 24 July, *C. F. Baker* (Pomona); near Cañon City, 1871, *T. S. Brandegee 71* (M); headwaters of Clear Creek, 1861, *Parry 235* (M); moist hillsides, Montrose, 6000 ft. alt., 13 June, 1913, *Payson 110* (M and R. Mt.); springy places, Mammoth Gulch, Tolland, 1 Aug., 1919, *Munz 3159* (Pomona); Tolland, 31 July, 1919, *Munz 3100* (Pomona); near Breckinridge, 9700 ft. alt., 11 Aug., 1906, *Anderson* (M); moist crevices, Fish Creek Falls, 21 July, 1903, *Goodding 1650* (R. Mt.); Twin Lakes, Aug., 1873, *Wolfe 313* (Cornell); Berthoud Pass, Grand Co., 11000–12000 ft. alt., July, 1903, *Tweedy 5739* (R. Mt.); Empire, Clear Creek Co., 8500 ft. alt., 15–25 July, 1903, *Tweedy 5740* (R. Mt.); Rock Mt., Gregory Canyon, near Boulder, 20 June, 1906, *Robbins 1616* (R. Mt.); wet places, Spring Creek, 4 June, 1911, *Payson 16* (R. Mt.); Dix, 10 July, 1898, *Baker, Earle & Tracy 451* (M and Pomona); alpine streams, Hahn's Peak, Routt Co., 27 July, 1903, *Goodding 1702* (Cornell, M, and R. Mt.); streams, base of Snowy Range, 24 July, 1872, *Redfield 240* (M); Breckenridge, Summit

Co., 9600 ft. alt., Aug., 1901, *Mackenzie 352* (M); Mancos, 21 June, 1898, *Baker, Earle & Tracy 819* (M); Bob Creek, W. La Plata Mts., 10000 ft. alt., 27 June, 1898, *Baker, Earle & Tracy 181* (Cornell, R. Mt., M, and Pomona); Gray-back Mining Camps and Placer Gulch, 25–27 June, 1900, *Rydberg & Vreeland 5658* (R. Mt.).

Utah: Logan Cañon, 6 June, 1898, *Mulford* (M); Fish Lake, around Twin Creeks, 8 Aug., 1905, *Rydberg & Carlton 7621* (R. Mt.); vicinity of Clayton Peak, Wasatch Mts., 8000 ft. alt., 12–26 Aug., 1903, *Stokes* (M); streams, Wasatch Range, 1 July, 1899, *Pammell 143* (M); hills north of Salt Lake City, 12 June, 1905, *Rydberg 6177* (R. Mt.); Ogden, 29 July, 1885, *Letterman* (M); near spring in calcareous rock, Ogden Cañon, 5000–6000 ft. alt., 17 July, 1902, *Pammel & Blackwood 3706* (M); Glenwood, 5500 ft. alt., 23 May, 1875, *Ward 90* (M); Parley's Canyon, Salt Lake Co., 23 June, 1906, *Garrett 1802* (R. Mt.); Brigham, Box Elder Co., 9 May, 1910, *Zundel 192* (M); Alta, 9000 ft. alt., 19 Aug., 1902, *Cooper 404* (R. Mt.).

Nevada: Little Lakes Canyon, Elko Co., 14 July, 1902, *Kennedy 577* (M and R. Mt.); King's Cañon, Ormsby Co., 5000–6000 ft. alt., 11 June, 1902, *C. F. Baker 1060* (M, R. Mt., and Pomona); Eagle Valley, 25 June, 1859, Lieut. Bryan's Exp., *Hayden* (M); in the creeks, Las Vegas, 5 May, 1905, *Goodding 2292* (M and R. Mt.); grassy stream hummocks, Deer Creek, 1 July, 1912, *Nelson & Macbride 1842* (R. Mt.); Beattie, Nye Co., 3500 ft. alt., 5 June, 1912, *Heller 10420* (M); wet shaded places, Caliente, 24 May, 1903, *Goodding 946* (Cornell and M); wet places, Karshaw Meadow Valley Wash, 27 May, 1902, *Goodding 982* (Cornell, M, and R. Mt.); Reno, Sept., 1888, *K. Brandegee* (M).

New Mexico: 1 mile west of Hillsboro, Sierra Co., 5600 ft. alt., 1 May, 1905, *Metcalfe 1537* (M); Organ Mts., Dona Ana Co., 16 April, 1893, *Wooton* (M); Pews River, 1 Aug., 1898, *Coghill 129* (M); Bear Mt., near Silver City, Grant Co., 5000 ft. alt., 24 April, 1903, *Metcalfe 28* (M and R. Mt.); wet soil, banks of Santa Fe Creek, June-July, 1847, *Fendler 558* (M); Pleasant Valley, 29 July, 1895, *Mulford 353* (M).

Arizona: fresh running water, Beaver Dam Creek, Virgin River, 13 May, 1902, *Goodding 769* (Cornell, M, and R. Mt.); near Flagstaff, 7000 ft. alt., 8 July, 1898, *MacDougal 244* (Cornell); in water, Clifton, 5 Mar., 1881, *Rusby 321* (Cornell and M); Mt. Lemon, Santa Catalina Mts., near Tucson, 26 July, 1917, *Munz* (Cornell); near Soldiers Camp, Santa Catalina Mts., 13 July, 1916, *Harris C16309* (M); Santa Catalina Mts., 26 July, 1917, *Munz 1145* (Pomona); Pinaleno Mts., Bonita, Aug., 1917, *Munz 1219* (Pomona); Ft. Grant, Pinaleno Mts., 18 July, 1917, *Munz* (Cornell); spring, Spud Ranch, Rincon Mts., 7400 ft. alt., 2 Oct., 1909, *Blumer 3433* (M); Fossil Creek, 22 Apr., 1904, *Chamberlain 44* (U. S.); in wet sand, Pipe Spring, 5000 ft. alt., 21 May, 1894, *Jones 5272* (M); in the water's edge, Miller's Cañon, Huachuca Mts., 8 June, 1909, *Goodding 115* (R. Mt.); Barfoot Park, 8000–8250 ft. alt., 19 Sept., 1906, *Blumer 1399* (M); swamps and creeks, Fort Whipple, 6 Aug., 1865, *Coues & Palmer 103* (M); fenced area, Santa Rita Forest Reserve, 20 April, 1903, *Griffiths 4182* (M); cold springs, Price Cañon, Chiricahua Mts., 22 July, 1907, *Goodding 2299* (R. Mt.).

Alaska: Juneau, 25 July, 1899, *Trelease & Saunders 4893* (M); Kukak Bay, 5 July, 1899, *Trelease & Saunders 4897* (M); Sand Point, Unga, 7 July, 1899, *Trelease & Saunders 4896* (M); Deer Mt., Ketchikan, 2300 ft. alt., 24 Aug., 1915, *Walker & Walker 982* (M and R. Mt.); grassy beach, Tongas Village, Portland Canal, 3 Aug., 1915, *Walker & Walker 885* (M and R. Mt.); near timber line, Kuiu Island, Port Malmosburg, 3 July, 1915, *Walker & Walker 778* (M and R. Mt.); river margins, Glacier River, Unalaska, 2 July, 1907, *Van Dyke 146* (G); Akutan, 21 Aug., 1907, *Van Dyke 321* (G); Sitka, 1865–66, *Bischoff* (G and Cornell); Bay, Sitka, 5 Aug., 1907, *Cowles 1305* (M); Kadiak Island, 1 July, 1899, *Trelease & Saunders 4894* (M); Kadiak Island, 2–4 July, 1899, *Fernow* (Cornell); Dutch Harbor, Unalaska, 6 July, 1907, *Van Dyke 27* (G); Nazan Bay, Atka, 26 July, 1907, *Van Dyke 245* (G); Yukatat Bay, 14 July, 1892, *Funston 55* (G, Cornell, and M).

British Columbia: on rocks along shore, June–July, 1901, *Rosendahl & Brand 6* (M, R. Mt., and Pomona); swamp at Howser Lake, 2000 ft. alt., 23 June, 1905, *Shaw 778* (M); Chilliwack

Valley, 29 June, 1901, *Macoun 54480* (M); Chilliwack Valley, 20 July, 1906, *Spreadborough* (Cornell); near Sproat Lake, 400 ft. alt., 26 June, 1907, *Rosendahl 1929* (M); North Fork of Illecillewaet, 3500 ft. alt., 26 Aug., 1904, *Shaw 567* (M); vicinity of Victoria, 19 May, 1893, *Macoun 702* (M); near mouth of Downie Creek, 1900 ft. alt., 9 Aug., 1905, *Shaw 1113* (M); wet place near Revelstoke Station, 1600 ft. alt., 9 July, 1905, *Shaw 857* (M); Mt. Finleyson, Vancouver Island, 18 May, 1887, *Macoun* (Cornell); vicinity of Ucleulet, Vancouver Island, 12 May, 1909, *Macoun 87665* (M).

Washington: Fresh Lake, Grand Coulee, 2 July, 1902, *MacKay 11* (M); Soap Lake, 28 June, 1902, *MacKay 17* (M); Clallam, Aug., 1900, *Elmer 2583* (M); in ditch, Northwood Swamp, Whatcom Co., July, 1919, *Muenscher 5070* (Cornell); near Montesano, Chehalis Co., 200 ft. alt., 29 June, 1898, *Heller & Heller 3986* (G, Cornell, M, and Pomona); near Montesano, Chehalis Co., 2 July, 1898, *Heller & Heller 4006*, in part (Cornell and M); growing in an old slough bed, Pleasant Ridge, Skagit Co., 4 Aug., 1918, *Roush 5* (M and Cornell); in moist places, Cold Creek, Yakima Region, 1 June, 1901, *Cotton 394* (M and R. Mt.); swamps and springs, Puyallup, 5 Aug., 1897, *Flett 161* (Cornell); Seattle, July, 1915, *Freiberg* (M); common in wet places, Seattle, 8 Oct., 1910, *Zeller* (M); Kanaka Bay, San Juan Islands, 25 June–1 Aug., 1917, *Zeller & Zeller 946* (M); McNeil's Island, 9 May, 1896, *Flett 34* (Cornell); Gray's Harbor City, 15 May, 1897, *Lamb 1065* (M); damp low ground, Klickitat River near Mt. Paddo, 26 June, 1885, *Suksdorf 478* (G); damp or wet places, W. Klickitat Co., 20 April, 1885, *Suksdorf* (M); along streams, W. Klickitat Co., 17 June, 1892, *Suksdorf 2136* (M); wet meadows, Falcon Valley, 2 July, 1885, *Suksdorf 473* (G); springs in woods, Falcon Valley, 31 July, 1885, *Suksdorf 474* (G); Argyle, 24 June, 1912, *Zeller* (M); Bog, Mt. Constitution, 5 July, 1907, *Cowles 362* (M); Nason Creek, 2150 ft. alt., 30 July, 1893, *Sandberg & Leiberg 618* (M); along the Tukanon River, 1 July, 1892, *Lake & Hull* (M); Coulee City, Douglas Co., 6 Aug., 1892, *Hull* (M); Newman Lake, Aug., 1913, *Turesson 27* (R. Mt.); 6 miles south of Pullman on Union Flat, 9 July, 1901, *Piper* (Pomona).

Oregon: wet situations, eastern Oregon, 29 June, 1899, *Cusick 2206* (Cornell and M); Horse Creek Cañon, Wallowa Co., 1775 ft. alt., 24 May, 1897, *Sheldon 8146* (M); The Dalles, Wasco Co., 5 April, 1902, *Sheldon S10034* (M); in a creek between Portland and Rex, 26 July, 1918, *Roush 1* (Cornell, M, and Stanford); Queen's Branch, Jackson Co., 18 June, 1892, *Hammond 311* (M); John Day near Tongue Point, Clatsop Co., 20 Aug., 1902, *Sheldon S11196* (M); near camp at Hasbrook Gulch, 4700 ft. alt., 15 July, 1897, *Sheldon 8580* (M); Tuolitin River, Clackamas Co., 23 Aug., 1903, *Sheldon S13006* (Stanford); shore of Columbia River above Astoria, 1883, *Meehan* (M); McGribble Ranger Station, 10 miles southeast of Port Oxford, 1 July, 1919, *Peck 8625* (M); St. Helen, May, 1887, *Howell 1244* (M); near Marshfield, Coos Co., 1 Sept., 1912, *House 4978* (U. S.); rocks on Umqua River, 11 Aug., 1880, *Engelmann* (M).

California: California, 1833, *Douglas* (K and G); ridges and meadows near Marble Mt., Siskiyou Co., 5000 ft., June, 1901, *Chandler 1694* (M); near Durney's Mill, in moist open places, Siskiyou Co., 30 June, 1919, *Heller 13284* (Cornell and M); wet places near Yreka, 29 May, 1910, *Butler 1423* (M and R. Mt.); near Yreka, 24 April, 1876, *Greene* (M); Shasta Springs, Siskiyou Co., 13 June, 1905, *Heller 8027* (M); Compton's Prairie, north base of Mt. Eddy, Siskiyou Co., 25 June, 1919, *Heller 13271* (Cornell and M); Metcalf's Ranch, northeast base of Mt. Eddy, 3800 ft. alt., 6 July, 1920, *Heller 13417* (M); Mt. Bidwell, Modoc Co., 5900 ft. alt., 7 Aug., 1918, *Jepson 7853* (Calif.); Jess Valley, Modoc Co., 5200 ft. alt., 12 Aug., 1918, *Jepson 7955* (Calif.); at Sisson's, Mt. Shasta, 25 Aug., 1880, *Engelmann* (M); marshy meadows, Sisson, 1894, *Jepson 21m* (Calif.); Sisson, 13 Aug., 1903, *Copeland*, distributed as *C. F. Baker 3808* (Pomona); Quincy, 3500 ft. alt., 16 June, 1910, *Jepson 4142* (Calif.); Prattville, Plumas Co., 11 July, 1907, *Heller & Kennedy 8794* (M); Bear Valley, Nevada Co., 4500 ft. alt., July, 1898, *Jepson 2m* (Calif.); springy woods, Fallen Leaf Lake, 27 June, 1920, *Ottley 900* (Wellesley, Cornell, and M); Penn Valley, Nevada Co., 24 May, 1919, *Heller 13191* (M); Truckee, July, 1886, *Sonne 267* (M); Blue Cañon, Sept., 1888, *K. Brandegee* (Cornell and M); 8 miles north of Oroville, 13 March, 1914, *Heller 11200* (M); near Oroville, Butte Co., 4 May, 1915, *Heller 11868* (Cornell and M); about springs on lava fields, Chico, Butte Co., 2 May, 1903, *Copeland*, distributed as *C. F. Baker 3017* (M and Pomona); Butte Meadows, Butte Co., 4200 ft. alt., 26 July, 1917, *Heller 12813* (Cornell and M); Chico Meadows, Butte Co., 4000 ft. alt., 22 June, 1914, *Heller 11492* (Cornell); near Clear Creek, Butte Co., 175 ft. alt., 1–15 May, 1897, *H. E. Brown 169* (M and R. Mt.); Table Mt., Olive Ranch north of Oroville, Butte Co., 23 May, 1912, *Heller 10755* (M); Berry Canyon, Butte Co., 8 May, 1902, *Heller & Brown 5493* (M); Alder Springs, Glenn Co., 4 July, 1917, *Heller 12771* (M); Big Horse Mt., South Fork of the Eel River, July–Aug., 1892, *Jepson 14m* (Calif.); summit of Yuba Pass, July, 1913, *Ames 18* (Calif.); base of South Butte, 20 April, 1891, *Jepson 15m* (Calif.); White Bar, Amador Co., 1000 ft. alt., May, 1895, *Hansen 1050* (M); New York Falls, Amador Co., 1500 ft. alt., 3 June, 1896, *Hansen 2053* (M); West Point Bridge, Calaveras Co., 2300 ft. alt., 7 July, 1896, *Hansen 1801* (M); Gwin Mine, Calaveras Co., 12 May, 1902, *Jepson 1812* (Calif.); French Camp, Tuolumne Co., 3000 ft. alt., 14 May, 1915, *A. L. Grant 5* (M); Phoenix Lake, near Sonora, Tuolumne Co., 20 May, 1917, *A. L. Grant 948* (G, U. S., Cornell, M, R. Mt., Ore., Calif., Calif. Acad., Stanford, and Pomona); Chinese Camp, Tuolumne Co., 30 May, 1915, *Jepson 6326* (Calif.); Hog Ranch, near Hetch-Hetchy Valley, 4700 ft. alt., 16 June, 1917, *A. L. Grant 969* (Cornell, M, Calif., and Pomona); Yosemite Valley, 13 June, 1891, *Fritchey 39* (M); wet meadow to Mirror Lake, Yosemite, 23 June, 1894, *Burnham* (Cornell); Fish Camp, Mariposa Co., 29 June, 1919, *Jepson 8397* (Calif.); Raymond, Madera Co., 9 June, 1894, *Burnham* (Cornell); Hart's Meadow, Madera Co., 23 June, 1918, *A. L. Grant 1309c* (Cornell, M, and Calif.); meadow near Fresno Dome, Madera Co., 23 June, 1918, *A. L. Grant 1309b* (Cornell, M, and Calif.); Arnold Meadow, Madera Co., 5000 ft. alt., 27 June, 1918, *A. L. Grant 1378* (Cornell, M, and Calif.); near Milo, Fresno Co., 24 April, 1919, *Goetz 5* (M); wet meadow, Pine Ridge, Fresno Co., 4700 ft. alt., 24 June, 1917, *A. L. Grant 1004* (G, Phil., Cornell, Calif., Stanford, and Pomona); stream-sides, Dinkey Ranger Station, Fresno Co., 5000 ft. alt., 29 July, 1917, *A. L. Grant 1181* (Cornell, M, Calif., Stanford, and Pomona); Huntington Lake, Fresno Co., 7000 ft. alt., 16 July, 1917, *A. L. Grant 1093* (N. Y., U. S., Cornell, M, R. Mt., and Calif.); Bakersfield, Kern Co., 6 May, 1905, *Heller 7838* (M); Weldon, Kern Co., 19 April, 1915, *Evermann* (M); Thorp's Meadow, Giant Forest, 3 Aug., 1900, *Dudley 3009* (Stanford); sloughs near Hanford, 24 June, 1901, *Kearney* (M); Middle Fork King's River, July, 1913, *Eliot* (Calif.); river's edge, Marble Fork, Sequoia National Park, 5800 ft. alt., 24 June–2 July, 1900, *Jepson 687* (Calif.); South Fork, Kaweah River, Tulare Co., 22 July, 1904, *Culbertson*, distributed as *C. F. Baker 4292* (M and Pomona); Natural Bridge Meadows, Tulare Co., 10 Aug., 1904, *Culbertson*, distributed as *C. F. Baker 4259* (M and Pomona); in ditch, Fales Hot Springs, Mono Co., 7 July, 1920, *Ottley 1116* (Wellesley and Cornell); Silver Canyon in the White Mts., east of Laws, Inyo Co., 29 May, 1906, *Heller 8343* (M); Bishop, Inyo Co., June, 1917, *Nordyke* (Cornell); Shepherd's Cañon, Argus Mts., 6000 ft. alt., Death Valley Expedition, 28 April, 1891, *Coville & Funston 740* (Cornell and M); near Comptche, Mendocino Co., 23–29 June, 1906, *Walker 383* (Pomona); Willits, 1400 ft. alt., 26 May, 1905, *Jepson 2503* (Calif.); springy bank above stream near the ocean, Fort Bragg, 25 June, 1921, *Ottley 1525* (Wellesley and Cornell); near Mendocino, June, 1898, *H. E. Brown 842* (M); Indian Valley, Lake Co., 23 May, 1920, *Jepson 8994* (Calif.); Cache Creek, Lake Co., 10 May, 1919, *Heller 13147* (Cornell and M); in the 'Horse Pasture,' near the summit of Mt. Sanhedrin, Lake Co., 20 July, 1902, *Heller 5924* (Cornell, Greene, M, R. Mt., and Pomona); Howell Mt. foothills, Napa River Basin, 24 April, 1893, *Jepson 4m* (Calif.); tule land near Dunnigan, 20 April, 1917, *Ferris 699* (M); Howell Mt., Sept., 1888, *K. Brandegee* (M); Vacaville, 20 Mar., 1901, *Jepson 1198a* (Calif.); Stewart's Cañon, near Falls, Sonoma Co., May, 1899, *M. S. Baker* (Pomona); Calistoga, Napa Co., 19 April, 1903, *C. F. Baker 1980* (M); near Ocean View, San Francisco, 8 June, 1906, *Heller 8376* (M); vicinity of Lake Merced, San Francisco Peninsula, May, 1903, *Gardner 567* (R. Mt.); on beach, San Francisco, 8 Aug., 1915, *Drushel* (M); sand hills near Cliff House, San Francisco, 14 March, 1902, *C. F. Baker 312* (Pomona); Berkeley Hills, 22 May, 1910, *Jepson 4043* (Calif.); Woodside, San Mateo Co., 4 May, 1902, *Abrams 2422* (M); Crystal Springs Lake, San Mateo Co., April, 1903, *Elmer 4857* (M and Pomona); Woodside, San Mateo Co., 4 May, 1902, *C. F. Baker 759* (M and Pomona); hills near Pescadero, San Mateo Co., 6 May, 1917, *A. L. Grant 942* (Cornell); Bell's Station, Pacheco Pass, 4 June, 1894, *Burnham* (Cornell); San Jose Hills, April, 1897, *Wislizenus 761* (M); along the Mt. Hamilton Road, 20 May, 1904, *Heller 7433* (M and R. Mt.); Smith Creek, foot of Mt. Hamilton, 10 May, 1907, *Heller 8517* (M); Santa Cruz, 1 July, 1903, *C. H. Thompson* (M); on the Carmel Road near Monterey, 9 June, 1903, *Heller 6829* (M, R. Mt., and Pomona); wet sand near Carmel River, Monterey Co., 2 May, 1921, *Ottley 1271* (Wellesley and Cornell); bluffs of the seashore, Pacific Grove, Aug., 1917, *Parish 11567* (M); Mohave River, Barstow, 2100 ft. alt., 7 June, 1912, *Jepson 4812* (Calif.); vicinity of Bonanza King Mine, Mohave Desert, 4000 ft. alt., 21–24 May, 1920, *Munz, Johnston & Harwood 4031*, in part (M and Pomona); Los Angeles River, Los Angeles Co., 8 April, 1901, *Abrams 1442* (Pomona); Acton, Los Angeles Co., June, 1902, *Elmer 3645* (M); San Gabriel Wash, Los Angeles Co., 12 May, 1920, *Ottley 681* (Wellesley and Cornell); Eaton Cañon, San Gabriel Mts., 2100 ft. alt., 1 June, 1918, *Pierson 198* (Calif.); Avalon, Santa Catalina Island, May, 1906, *Trask* (M); Santa Catalina Island, 21–26 April, 1904, *Grant & Wheeler 6135* (M and R. Mt.); hills near Claremont, 12 Aug., 1903, *C. F. Baker 3460* (Pomona); near stream, Bear Flats, mountains above Claremont, 30 June, 1915, *Crawford* (M and Pomona); wet springy place in South Hills, Pomona, 19 May, 1918, *Munz 2266* (Cornell and Pomona); San Clemente Island, June, 1903, *Trask 342* and *343* (U. S.); Hemet, Riverside Co., 5 April, 1904, *C. F. Baker 4142* (Pomona); cement standpipe of irrigation ditch, Ohio Ave., Riverside, 5 Jan., 1920, *Barrus 71* (Cornell); swampy ground, Red

Hill near Upland, San Bernardino Co., 28 April, 1917, *I. M. Johnston 1204* (Pomona); near San Bernardino, May, 1894, *Parish* (Calif.); borders of Warm Creek, San Bernardino Valley, about 900 ft. alt., 14 May, 1917, *Parish 11191* (M and Pomona); Bluff Lake, San Bernardino Mts., 5 Sept., 1915, *Gardner 513* (Pomona); City Creek, San Bernardino Mts., 5 June, 1911, *Parish 11311* (M and Pomona); Mill Creek Cañon, San Bernardino Mts., May, 1913, *Jepson 5569* (Cornell and M); Idyllwild, San Jacinto Mts., 5300 ft. alt., 1921, *Spencer 1709* (Pomona); San Diego, 1874, *Cleveland* (M); borders of Cuyamaca Lake, San Diego Co., 25 June, 1903, *Abrams 3877* (M); southwestern part of Colorado Desert, San Diego Co., April, 1889, *Orcutt* (M); meadow at Jacumba, San Diego Co., 13 Aug., 1917, *Munz* (Cornell); Del Mar, San Diego Co., 4 May, 1895, *Angier 192* (M); San Luis Rey, San Diego Co., 10 May, 1882, *Orcutt 134* (M); Bubbling Spring, Collins Valley, 28 April, 1920, *Jepson 8833* (Calif.).

Mexico:

Lower California: near Encenada de Todas Santos, northern Lower California, 13 July, 1885, *Orcutt* (M).

Chihuahua: near Colonia Juarez, June–July, 1899, *E. W. Nelson 6027* (G); vicinity of Chihuahua, about 4000 ft. alt., 8–27 April, 1908, *Edw. Palmer 16* (M); vicinity of Madera, about 6750 ft. alt., 27 May–3 June, 1908, *Edw. Palmer 289* (M); vicinity of Chihuahua, about 4000 ft. alt., 1–21 May, 1908, *Edw. Palmer 145* (M); vicinity of Chihuahua, 8–27 April, 1908, *Edw. Palmer 17* (M); near Colonia Garcia in the Sierra Madres, 9 June, 1899, *Townsend & Barber 28* (G, M, and R. Mt.); river gravel, Chihuahua, 14 April, 1886, *Pringle 889* (M).

This species is the most common and the most polymorphic in the genus. It varies greatly with environmental conditions, especially in relation to the size of the stem, leaves, and flowers. In several experiments, plants were marked early in the season which had corollas 3.5–4.5 cm. long; late in the summer, flowers produced on these same plants were less than half that length. The variety *grandis* of Greene is therefore considered to be a direct response to environment, the size of the parts being dependent on the amount of water available or on the vitality of the plant.

In general, *M. guttatus* may be separated from the other members of the genus by its stout fistulous stems, its rounded leaves with the blade often as broad as long, its racemose inflorescence in which the floral leaves are mostly reduced to small bracts, and by its stout pedicels, commonly shorter than the flowers. Many species and varieties have been separated from this aggregate and of these only the following seem worthy of varietal distinction. Some show so many intermediates that it has been with considerable hesitation that such varieties as *depauperatus* and *puberulus* are retained. The writer feels, however, that their retention will lead to greater clearness.

14a. Var. **puberulus** (Greene) Grant, comb. nov.

M. puberulus Greene, acc. to Rydb. Fl. Colo. 311. 1906, *nomen nudum;* Greene, Leafl. Bot. Obs. & Crit. **2**: 4. 1909; Woot. & Standl. Contr. U. S. Nat. Herb. **19**: 587. 1915; Rydb. Fl. Rocky Mountains, 778. 1917.

Perennial; stems erect, densely pubescent above, often freely branched from the base; leaves broadly ovate or elliptical, 1–4 cm. long, acute or obtuse, puberulent or pubescent, usually grayish-green; pedicels shorter than the flowers, sometimes recurved in fruit; corolla 2–3 cm. long.

Distribution: in wet places in southern Colorado and northern New Mexico.

Specimens examined:

Colorado: Pagosa Springs, 27 July, 1899, *C. F. Baker 587* (U. S., Greene, TYPE, M, R. Mt., and Pomona); Keating, Fremont Co., without date, *Comstock* (Cornell); near Boulder, 9 June, 1900, *Ramaley 115* (R. Mt.).

New Mexico: mouth of Pouchuelo Creek, Pecos River National Forest, 8500 ft. alt., 30 June, 1908, *Standley 4089* (M).

14b. Var. **depauperatus** (Gray) Grant, comb. nov.

M. luteus var. *depauperatus* Gray in Bot. Calif. **1**: 567. 1876; Syn. Fl. N. Am. **2**[1]: 277. 1878, ed. 2, and Suppl. 448. 1886; Henry, Fl. Brit. Columbia, 268. 1915.

M. microphyllus Benth. in DC. Prodr. **10**: 371. 1846; Greene in Bull. Calif. Acad. Sci. **1**: 111. 1885; Howell, Fl. Northwest

Am. 521. 1901; Abrams, Fl. Los Angeles, 367. 1904, and ed. 2, 337. 1917; Rydb. Fl. Rocky Mountains, 779. 1917.

M. tenellus Nutt. ex Gray, Proc. Am. Acad. **11**: 98. 1876.

M. thermalis Nels. in Bull. Torr. Bot. Club **27**: 269. 1900; Rydb. Fl. Rocky Mountains, 779. 1917.

M. longulus Greene, Leafl. Bot. Obs. & Crit. **2**: 4. 1909.

M. Langsdorfii var. *microphyllus* Nels. & Macbr. in Bot. Gaz. **61**: 44. 1916.

M. puncticalyx Gdgr. in Bull. Soc. Bot. Fr. **19**: 219. 1919.

Annual; stem erect, 3–25 cm. high, mostly simple, slender, glabrous or pubescent, 4-angled; internodes long, leaves few, thin, orbicular or broadly ovate, 1–3.5 cm. long, 1–1.5 cm. wide, obtuse, denticulate to irregularly dentate, sometimes lyrate or with the margins nearly entire, lower leaves with petioles nearly as long as the blade; flowers solitary or in a short raceme, pedicels slender, frequently recurved when mature; calyx campanulate, often dotted or tinged with red, glabrous or puberulent, subglobose in fruit, 5–12 mm. long, 4–8 mm. wide, teeth short, broadly deltoid, obtuse or acute, the upper tooth about twice as long as the others, throat much constricted, giving an elliptical appearance; corolla from 1½ to 3 times the length of the calyx; style glabrous; capsule stipitate.

Distribution: in wet places in the mountains from Wyoming and Idaho to Washington, south to California.

Specimens examined:

Wyoming: on geyser formations, Upper Geyser Basin, 3 Aug., 1899, *Nelson & Nelson 6285* (M and R. Mt.); Upper Geyser, Yellowstone Park, without date, *Broadhead* (M); Mineral Hot Springs, Yellowstone Park, July, 1904, *Oleson 15* (R. Mt.); Fire Hole, Yellowstone Park, July, 1904, *Oleson 22* (R. Mt.); on the "formations" and frequent in Yellowstone Park, 16 July, 1912, *Churchill* (M).

Idaho: gravelly wet places, Squaw Butte, Canyon Co., 3500 ft. alt., 29 May, 1910, *Macbride 143* (R. Mt.); margins of hot sulphur spring bogs, Ketchum and Guyer Hot Springs, 22 July, 1911, *Nelson & Macbride 1278* (R. Mt.); very moist meadow east of Bennington, 4 Aug., 1913, *Schoper 17* (R. Mt.).

Nevada: King's Cañon, Ormsby Co., 11 June, 1902, *C. F. Baker 1058* (M, R. Mt., and Pomona).

Washington: Kanaka Bay, San Juan Islands, 25 June–1 Aug., 1917, *Zeller & Zeller 947* (M); Loon Lake, Stevens Co., 29 June, 1913, *Turesson 26* (R. Mt.); wet, rocky places on mountain-sides near Bingen, W. Klickitat Co., 21 April–17 June, 1896, *Suksdorf 2773* (M); on damp ground, W. Klickitat Co., 3 Aug., 1894, *Suksdorf 2321* (M).

Oregon: Hood River on the Columbia, 1885, *Barrett* (G); near summit of Mt. Scott, 5000 ft. alt., 21 July, 1899, *Barber 11* (G); Drew's Valley Creek, Lake Co., 4 Aug., 1897, *Austin 1543* (U. S.); St. Helen, Aug., 1913, *von Schrenk* (M); wet bank, Riddle, Douglas Co., 4 Aug., 1916, *Peck 5606* (G); Crater Lake National Park, 20 July, 1918, *Heller 13061* (M and Cornell); Seaside, July, 1922, *Epling 5551* (Epling).

California: plains east of Chico, Butte Co., April, 1896, *Austin 85* (M); Webber Lake, 8 July, 1901, *Kennedy & Doten 118* (R. Mt.); lower end of Donner Lake, 8 Aug., 1903, *Heller 7163* (M); Table Mt., Tuolumne Co., 9 June, 1915, *Jepson 6429* (Calif.); Table Mt., near Columbia, 9 June, 1915, *A. L. Grant 15m* (Cornell and M); near Cherry Creek on the trail to Lake Eleanor, 12 June, 1918, *A. L. Grant 1231* (Cornell and M); Hetch-Hetchy to Hog Ranch, 30 July, 1909, *Jepson 3482* (Calif.); Hetch-Hetchy Valley, 4700 ft. alt., 14 June, 1917, *A. L. Grant 977* (Cornell, M, and Calif.); Yosemite Creek Trail, 18 June, 1918, *A. L. Grant 1290* (Calif.); Ranger's Cabin at Hog Ranch, above Hetch-Hetchy Valley, 4700 ft. alt., 10 June, 1916, *A. L. Grant 803* (Cornell and M); Little Kern River, near Trout Meadows, 29 June, 1912, *Jepson 4909* (Calif.); in the foothills west of Bishop, Inyo Co., 23 May, 1906, *Heller 8323* (M); in wet moss, Idyllwild, San Jacinto Mt., 5400 ft. alt., 22 June, 1921, *Spencer 1671* (Pomona).

14c. Var. **Hallii** (Greene) Grant, comb. nov.

M. Hallii Greene in Bull. Calif. Acad. Sci. **1**: 113. 1885; Nelson in Coulter & Nelson, Manual Cent. Rocky Mountains, 454. 1909; Rydb. Fl. Rocky Mountains, 779. 1917.

A small glabrous annual, .5–2.5 cm. long; stem erect or nearly so; leaves light green, rounded, irregularly denticulate, sometimes almost entire; pedicels slender, longer than the leaves, erect or ascending; mature calyx much inflated, subglobose, sometimes sparingly spotted with red, teeth broadly triangular, acute, upper tooth longer than the others, all folded toward the center when mature; corolla little longer than the calyx.

Distribution: wet places in the mountains of Idaho, Colorado, and Nevada.

Specimens examined:

Idaho: wet woods; Hot Hole, East Fork Bruneau, Owyhee Co., 3 July, 1912, *Nelson & Macbride 1908* (G, M, and R. Mt.).

Colorado: Rocky Mt. Flora, Lat. 39°–41°, 1862, *Hall & Harbour 398* (M, *type collection*); stream, Boulder, 5700 ft. alt., 20 June, 1906, *Daniels 25* (M); Boulder, 10 June, 1901, *Wheeler 313* (R. Mt.); mouth of Boulder Cañon, 3 June, 1901, *Ramaley 707* (R. Mt.); Sunshine Canyon, near Boulder, 19 June, 1906, *Robbins 1599* (R. Mt.); damp places, Georgetown, 8500 ft. alt., 18 July, 1892, *Patterson 294* (M); Piedra, 14 July, 1899, *C. F. Baker 588* (G, M, R. Mt., and Pomona).

Nevada: Lone Mountain, Elko Co., 7000 ft. alt., 5 Aug., 1913, *Kennedy 4356* (Stanford); Star Canyon, southeast of Deeth, Elko Co., 5600 ft. alt., 10 July, 1912, *Heller 10569* (M and Stanford).

14d. Var. **decorus** Grant[1] Pl. 4, fig. 1.

A tall glabrous perennial, stem 2–10 dm. high; leaves few, broadly ovate, 2–6 cm. long, 2–3 cm. wide, acute, coarsely and doubly dentate, 5–7-nerved, cordate to almost truncate at the base, petioled, floral leaves sessile, internodes very long; pedicels stout, shorter than the corolla; calyx broadly campanulate, teeth short, broad, acute, the upper longer; corolla 3–4.5 cm. long, tube short, throat ventricose, dotted with red on the lower side; style minutely pubescent.

Distribution: wet places in Washington and Oregon.

Specimens examined:

Washington: Mt. Tacoma, without date, *Flett 9* (Cornell); near Montesano, Chehalis Co., 200 ft. alt., 2 July, 1898, *Heller &*

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[1] **Mimulus guttatus** DC. var. **decorus** Grant, var. nov., perennis altus; foliis late-ovatis, acutis, crasse et dupliciter dentatis, petiolo brevi; pedunculis robustis corolla brevioribus; corolla 3–4.5 cm. longa.—Collected in the vicinity of Oregon City, Oregon, June 11, 1905, *M. W. Lyon, Jr. 59* (Mo. Bot. Gard. Herb., no. 866366, TYPE).

Heller 4006 (R. Mt. and Pomona); in Moss Creek near Chenowith, Skamania Co., 8 July, 12 Aug., 1896, *Suksdorf 2774* (M); Skokomish Valley, Mason Co., 11 June, 1892, *Henderson* (M).
Oregon: along a mountain stream, Portland, 3 July, 1903, *Lunell* (R. Mt.); wet meadow, vicinity of Oregon City, 11 June, 1905, *Lyon 59* (M, TYPE); swampy ground, Calapooya Valley, 3500 ft. alt., 17 July, 1899, *Barber* (R. Mt.); Oregon, June, 1881, *Dickson 6396* (M); Oregon, 1871, *E. Hall 374* (M and G).

14e. Var. **arvensis** (Greene) Grant, comb. nov. Pl. 10, figs. 7–9.

M. arvensis Greene, Pittonia **1**: 37. 1887; Manual Bay Region, 277. 1894.

M. Langsdorfii var. *arvensis* Jepson, Fl. W. Mid. Calif. 407. 1901, and ed. 2, 379. 1911.

M. marmoratus Greene in Erythea **3**: 73. 1895.

Annual, stem and branches nearly glabrous, internodes elongated; lower leaves rounded-ovate or oblong, long-petioled, more or less lyrate, floral leaves sessile, usually villous on the lower surface; upper calyx-tooth not markedly longer than the others, giving a short stubby, almost truncate appearance when mature; calyx slightly constricted at the throat, the teeth rarely folded over each other; corolla 1–3 cm. long.

Distribution: wet places in the foothills and valleys of central California.

Specimens examined:

California: Ukiah Valley, 2 June, 1921, *Jepson 9285* (Calif.); in rich moist loam, valley west of Leesville, Colusa Co., 10 May, 1919, *Heller* (M); between Shingle Springs and El Dorado, Eldorado Co., 7 April, 1911, *Heller 12299* (Cornell and M); New York Falls, Amador Co., April, 1895, *Hansen 1048* (M); Agricultural Station, Amador Co., May, 1892, *Hansen 1287* (M); on moist rocks, Knight's Ferry, Stanislaus Co., 9 April, 1895, *Bancroft* (Greene); Hog Ranch, Yosemite Park, 3 Aug., 1911, *Jepson 4628* (Calif.); Yosemite Valley near the Royal Arches, 28 June, 1919, *Jepson 8370* (Calif.); near Comptche, Mendocino Co., 23–29 June, 1906, *Walker 347* (Pomona); near Windsor, Sonoma Co., 18 April, 1902, *Heller & Brown 5331* (Cornell and M); Santa Rosa Creek, east of Santa Rosa, Sonoma Co., 11 June, 1902, *Heller 5687* (Cornell, M, and Pomona); Calistoga, 6 May, 1921, *Jepson 9171* (Calif.); trail to Caux's Cabin, Hood's Peak Range, west of St. Helena, 25 April, 1893, *Jepson 11m* (Calif.); hills east of St. Helena, 23 April, 1915, *Jepson 6238* and *6238a* (Cornell, M, and Calif.); Howell Mt., Napa River Basin, 8 May, 1893, *Jepson 10m* (Calif.); West Berkeley, 25 April, 1891, *Jepson 1m* (Calif.); Berkeley, May–June, 1906, *Walker 440* (Pomona); San Mateo, 21 April, 1894, *Burnham* (Cornell); Stanford University, 25 April, 1902, *Abrams 2370* (M); summit of the first ridge west of Los Gatos, 9 May, 1904, *Heller 7393* (M and R. Mt.); near Burke's Ranch, Stanford University, 13 April, 1894, *Burnham* (Cornell and Pomona).

In general, this variety can be distinguished by its short, somewhat truncate mature calyx, its long-petioled, more or less lyrate lower leaves, and the sessile floral ones, which are white-villous below. The corolla, usually, is much smaller than in the species. The same characters will generally separate it from the var. *depauperatus* with which it might be confused.

15. **M. glaucescens** Greene in Bull. Calif. Acad. Sci. **1**: 113. 1885; Gray, Syn. Fl. N. Am. ed. 2, 2^1: Suppl. 448. 1886.

Mostly glabrous and glaucous annuals; stem erect, .5–4 dm. high, simple or branched, terete, occasionally quadrangular above; lower leaves bright green, round-ovate or subcordate, 2–10 cm. long, 3–5-nerved from the base, coarsely and irregularly toothed, occasionally lobed at the base, petioles slender, as long as or much longer than the blade, sometimes pubescent or villous, upper leaves few, sessile, orbicular, about as broad as long, becoming connate-perfoliate below the flowers, more or less conspicuously glaucous, nearly entire or with small scattered teeth; pedicels commonly about as long as the mature calyx, occasionally twice as long, stout, strongly recurved; calyx broadly campanulate, 1.1–1.3 cm. long, at maturity 1.5–2 cm. long, 9–11 mm. broad, teeth short, broadly triangular, blunt, the upper slightly longer, the lower folding over the lateral teeth and closing the orifice, densely villous with soft white hairs at the sinuses; corolla 2–3.5 cm. long, lower lip spreading, bearded, more or less spotted with red; style puberulent, slightly exserted; capsule oblong, short-stipitate, more than half as long as the calyx; seeds reticulate.

Distribution: local in the foothills in Nevada Co., in Tehama Co., and in the northern part of Butte Co., California.

Specimens examined:

California: 8 miles south of Vina in wet sand, edge of Pine Creek, Tehama Co., 29 April, 1914, *Heller 11340* (Cornell, F, and Greene); Berry Canyon, near Clear Creek, Butte Co., 6 May, 1902, *Heller & Brown 5461* (Cornell, F, M, R. Mt., and Pomona); Chico, Butte Co., March, 1899, *Copeland* (Stanford); Little Chico Creek, Butte Co., April, 1883, *Austin 213* (Greene, Calif. Acad., TYPE, and Calif.); Little Chico Canyon, Butte Co., 1896, *Austin 159* (M); Chico, Butte Co., 15 May, 1903, *Copeland 3177*, distributed as *C. F. Baker 3177* (M, F, R. Mt., and Pomona); Cañon of Big Chico Creek, Butte Co., 2 July, 1914, *Heller* (M); Butte Co., June, 1889, *Parry* (M); low ground, 12 miles north of Chico, 29 April, 1914, *Heller 11340a* (M); Chico Creek, April, 1885, *Gray* (G); Chico, June, 1890, *Greene* (Greene); Penn Valley, west of Grass Valley, Nevada Co., 24 May, 1919, *Heller 13191* (Cornell).

M. glaucescens is unique in the genus by reason of its glaucous, connate-perfoliate upper leaves.

16. M. nudatus Curran ex Greene in Bull. Calif. Acad. Sci. 1: 114. 1885; Gray, Syn. Fl. N. Am. ed. 2, 2^1: Suppl. 449. 1886.

A nearly glabrous annual; stem terete, freely branched from the base, erect or ascending, 9–30 cm. high, branches mostly reddish-purple; leaves very few, scattered, long-petioled, narrowly spatulate to oblanceolate, 1–3 cm. long, 1–5 mm. broad, denticulate, the upper sessile and mostly linear; pedicels erect in flower, little longer than the corolla, becoming elongated in fruit, spreading or divaricate, rarely recurved; calyx ovate, campanulate, somewhat elliptical in fruit, 9–12 mm. long, almost glabrous, even at the sinuses, teeth nearly equal, obtuse, the lower folding over the lateral ones and nearly closing the orifice; corolla 1.5–2 cm. long, tube exserted, throat densely bearded and dotted with red below the lower lip; style puberulent, stigma-lips unequal; capsule short-stipitate, compressed, elliptical, little shorter than the calyx; seeds oblong.

Distribution: known only from Lake Co., California, where it grows in open gravelly places.

Specimens examined:

California: Kelsey Mt., Lake Co., June, 1884, *Curran* (G, *type collection*); Lake Co., May, 1890, *K. Brandegee* (G and U. S.); Bradford, Lake Co., May, 1890, *K. Brandegee* (Calif. and Pomona); valley of a tributary of Cache Creek, near Hough's Springs, 10 May, 1919, *Heller 13142* (Cornell and M).

17. M. nasutus Greene in Bull. Calif. Acad. Sci. **1**: 112. 1885; Manual Bay Region, 277. 1894; Gray, Syn. Fl. N. Am. ed. 2, **2**¹: Suppl. 449. 1886; Howell, Fl. Northwest Am. 521. 1901; Eastwood, Fl. South Fork King's River, Sierra Club Publ. **27**: 65. 1902; Abrams, Fl. Los Angeles, 366. 1904, and ed. 2, 337. 1917; Henry, Fl. Brit. Columbia, 269. 1915; Piper & Beattie, Fl. Northwest Coast, 324. 1915; Rydb. Fl. Rocky Mountains, 778. 1917. Pl. 10, fig. 1.

M. luteus, in part, of many authors.

M. Langsdorfii, in part, of many authors.

M. luteus var. *depauperatus* Gray in Bot. Calif. **1**: 567. 1876, in part; Syn. Fl. N. Am. **2**¹: 277. 1878, and ed. 2, 1886.

M. subreniformis Greene in Erythea **3**: 67. 1895.

M. glareosus Greene, Pittonia **2**: 282. 1889; Manual Bay Region, 277. 1894.

M. Langsdorfii var. *nasutus* Jepson, Fl. W. Mid. Calif. 407. 1901, and ed. 2, 379. 1911.

M. erosus Greene, Leafl. Bot. Obs. & Crit. **2**: 4. 1909.

M. minusculus Greene, Leafl. Bot. Obs. & Crit. **2**: 5. 1909.

M. cordatus Greene, Leafl. Bot. Obs. & Crit. **2**: 5. 1909, Woot. & Standl. Contr. U. S. Nat. Herb. **19**: 587. 1915.

M. cuspidatus Greene, Leafl. Bot. Obs. & Crit. **2**: 6. 1909.

M. puberulus Gdgr. in Bull. Soc. Bot. Fr. **19**: 219. 1919, not Greene.

M. Bakeri Gdgr. in Bull. Soc. Bot. Fr. **19**: 219. 1919.

M. Parishii Gdgr. in Bull. Soc. Bot. Fr. **19**: 219. 1919, not Greene.

Puberulent to nearly glabrous annuals, rarely pubescent; stem usually branched from the base, erect or ascending, .5–6 dm. high, quadrangular, frequently winged, fistulous when growing under very favorable conditions; leaves 3–5-nerved, round-ovate or oblong, .5–11 cm. long, nearly as broad, irregularly and coarsely dentate or lobed, often with additional small lobes at the base of the blade, more or less tinged with red on the lower surface, lower leaves with long, broad, clasping petioles, the upper leaves sessile; inflorescence racemose, pedicels nearly glabrous, 2–3 times as long as the mature calyx, erect, becoming strongly recurved in fruit; calyx appressed-puberulent, with short white hairs at the sinuses, frequently tinged with red, much inflated when mature, .6–1.8 cm. long, 3–11 mm. wide, teeth acute, the upper about 3 times as long as the others, the latter folding over and appearing as though truncate with a long index-finger pointing outward; corolla varying greatly in size from .7 to 2.3 cm. long, the lower lip densely bearded, spreading and much longer than the upper lip, usually with a reddish-brown blotch below the middle lobe and numerous smaller dots down the throat; style puberulent, stigma-lips unequal; capsule short-stipitate, oblong; seeds reticulate.

Distribution: in moist places from the Rocky Mountain states and British Columbia, south to northern Mexico; especially abundant in the foothills of California.

Specimens examined:

Idaho: brook edges, Big Willow, Canyon Co., 3000 ft. alt., 1 June, 1910, *Macbride 170* (M and R. Mt.); near Lewiston, Nez Perces Co., 1500–2000 ft. alt., 29 May, 1896, *Heller & Heller 3143* (Cornell and M); wet bank, Salmon, 23 June, 1920, *Payson & Payson 1754* (M).

New Mexico: Van Patten's, Organ Mts., Dona Ana Co., 14 May, 1899, *Wooton 28*, in part (U. S. and Greene).

Arizona: Fort Lowell, 2400 ft. alt., 25 April, 1903, *Thornber 379* (M); banks of the Rillita, 9 April, 1881, *Pringle* (M).

Nevada: Verdi, May, 1890, *Sonne* (M).

British Columbia: Cadboro Bay, Victoria, 1 May, 1908, *Macoun 87662* (Cornell); rocky cliffs, Victoria, 4 April, 1914, *Henry* (R. Mt.).

Washington: rocky springs, Columbia River, W. Klickitat Co., May, 1885, *Suksdorf 792* (M); sandy banks of the Columbia River, W. Klickitat Co., 4 May, 1885, *Suksdorf 476* (G); on bare wet rocks, Mt. Paddo, 5000–6000 ft. alt., 28 June, 1885, *Suksdorf 480* (G); river bank, Bingen, W. Klickitat Co., 17 April, 1905, *Suksdorf 5016* (M); in rock crevices, Almata, 2 May, 1897, *Piper 2783* (G and Pomona); dense patches in springy places on cliffs, Wawawai, Whitman Co., May, 1897, *Elmer 777* (M, R. Mt., and Pomona); Rock Lake, Whitman Co., 1800 ft. alt., 30 May, 1893, *Sandberg & Leiberg 110* (M).

Oregon: wet rocks, eastern Oregon, 15 June, 1897, *Cusick 1627* (Cornell and M); Gibbon, Umatilla Co., 4 June, 1910, *Heller 10192* (Stanford).

California: Marysville Buttes, Sutter Co., 8 April, 1914, *Heller* (M); South Butte, Sutter Co., 20 April, 1891, *Jepson 19m* (Calif.); Berry Canyon, near Clear Creek, Butte Co., 8 May, 1902, *Heller & Brown 5503* (G, Cornell, and M); near Redding, Shasta Co., 26 May, 1905, *Heller 7858* (U. S. and M); near Vina, Tehama Co., 29 April, 1914, *Heller 11339* (M); Alta, Placer Co., June, 1889, *T. S. Brandegee* (M); in cleft of rock, Damp Trail around Echo Lake, Eldorado Co., 13 June, 1920, *Ottley 1180* (Wellesley, Cornell, and M); Little Chico Creek, 1883, *Austin* (G); Webber Lake, 5 May, 1901, *Kennedy & Doten 106* (R. Mt.); Lakeport, April, 1889, *K. Brandegee* (M); Hood's Peak, Sonoma Co., June, 1893, *Michener & Bioletti* (Pomona); wash of the Napa River, between Napa and Yountville, 6 May, 1921, *Ottley 1315* (Wellesley); Yountville, Napa Co., 6 May, 1921, *Jepson 9168* and *9169* (Calif.); Knight's Valley, Sonoma Co., 1877, *Edwards* (G, *type collection*); Calistoga, 6 May, 1921, *Jepson 9172* and *9173* (Calif.); fields east of Santa Rosa, Sonoma Co., 16 April, 1902, *Heller & Brown 5306* (M); creek bed west of Calistoga, 1 May, 1893, *Jepson 6m* (Calif.); Weldon Cañon, Vaca Mts., 17 May, 1892, *Jepson 66m* (Calif.); Lake Co., 30 Aug., 1888, *Greene* (Greene); Mt. St. Helena, Napa Co., 20 April, 1903, *C. F. Baker 2608* (M, R. Mt., and Pomona); Napa Range, east of Calistoga, New Pope Valley Grade, 2 May, 1893, *Jepson 7m* (Calif.); Pope Valley Grade from Calistoga, 1 June, 1909, *K. Brandegee*

(M); Tocaloma, Marin Co., May, 1893, *Michener & Bioletti* (M); trail near Fairfax, Marin Co., 21 April, 1921, *Ottley 1242* (Wellesley and Cornell); Ross Valley, Marin Co., 5 April, 1892, *Jepson 3m* (Calif.); San Rafael Creek, Marin Co., April, 1885, *Gray* (G); above the Alma Soda Spring near the "French Settlement," Santa Clara Co., 14 June, 1904, *Heller 7508* (G, M, and R. Mt.); Smith Creek, at foot of Mt. Hamilton, Santa Clara Co., 30 May, 1907, *Heller 8591* (M); Mt. Stanford, Nevada Co., July, 1890, *Sonne 263* (M); Fisher Cabin, Amador or Calaveras Co., 1200 ft. alt., 13 May, 1896, *Hansen 473* (U. S.); Middle Fork, Amador Co., 1500 ft. alt., April, 1892, *Hansen 1288* (M); New York Falls, Amador Co., April, 1895, *Hansen 1049* (M); Middle Fork, Amador Co., 1500 ft. alt., April, 1893, *Hansen 135* (M and Stanford); in serpentine rock crevices, Red Hills above Peoria Flat, Tuolumne Co., 1600 ft. alt., 11–16 April, 1919, *Ferris 1602* (Stanford); rock crevice, Spring Gulch above Bear Creek, Tuolumne Co., 1050 ft. alt., 11–16 April, 1919, *Ferris 1626* (Stanford); Phoenix Lake near Sonora, Tuolumne Co., 2000 ft. alt., 20 May, 1917, *A. L. Grant 949* (Cornell, Phil., M, U. S., and Calif.); along edges of small streams, Hetch-Hetchy Valley, Tuolumne Co., 3660 ft. alt., 15 June, 1918, *A. L. Grant 1265* and *1266* (Cornell, M, Calif., and Pomona); Hog Ranch, above Hetch-Hetchy Valley, 4700 ft. alt., 16 June, 1917, *A. L. Grant 989* (Cornell and M); Yosemite Falls, 5300 ft. alt., 25 June, 1911, *Jepson 4274a* (Calif.); Yosemite, July, 1902, *Bacon* (Stanford); edge of stream, above Pollasky, Madera Co., 12 April, 1906, *Heller 8158* (M); along edges of small streams, Huntington Lake, Fresno Co., 7000 ft. alt., 25 June, 1917, *A. L. Grant 1006* (Cornell, M, Ore., and Calif.); Huntington Lake, Fresno Co., 20 July, 1917, *A. L. Grant 1133* (U. S., Phil., and Pomona); near Mineral King, 4 Aug., 1891, *Coville & Funston 1457* (Cornell); Santa Barbara, May, 1902, *Elmer 3821* (M); along creeks in cañons, Sierra Santa Monica, June, 1891, *Hasse* (M); Little Santa Anita Cañon, Los Angeles Co., 1 July, 1902, *Abrams 2612* (M); abundant in a mossy seep, small gulch above Canyon Station, San Antonio Mts., 3000 ft. alt., 17 May, 1920, *I. M. Johnston 2307* (M and Pomona); San Jacinto River Canyon, 30 May, 1917, *Jenkins & Street* (Pomona); around small spring, vicinity of Bonanza King Mine, east slope of Providence Mts., Mohave Desert, 21–24 May, 1920, *Munz, Johnston & Harwood 4031* in part (M and Pomona); Milliards Cañon, San Gabriel Mts., 2500 ft. alt., 19 May, 1918, *Pierson 197* (Calif.); Reche Cañon, near San Bernardino, 20 May, 1894, *Parish* (Calif.); southern slope of the San Bernardino Mts., 3500 ft. alt., 29 May, 1906, *Parish 5764* (R. Mt.); wet sand in wash, Upland, San Bernardino Co., 4 May, 1917, *Parish 11170* (M); Cascade Cañon, San Antonio Mts., 4250 ft. alt., 23 June, 1918, *I. M. Johnston* (Pomona); edge of small stream, Devil's Canyon, 1500 ft. alt., 10 May, 1919, *Munz 2780* (Pomona); Harvey's Ranch, near El Nido, San Diego Co., 20 May, 1903, *Abrams 3538* (M); stream-sides and canyons, La Jolla, 1 June, 1914, *Clements & Clements 126* (M).

Mexico:

Chihuahua: springy places, Sierra Madre, 29 Sept., 1887, *Pringle 1347* (U. S.).

Lower California: near San Rafael, northern Lower California, 11 July, 1885, *Orcutt 1304* (M); All Saints Bay, April, 1885, *Greene* (G); Santa Agneda, 1890, *Edw. Palmer 233* (U. S.); Lower California, 4–6 March, 1890, *Edw. Palmer 233* (U. S.).

This species exhibits wide variation in the size of the plant, the length of the flowers, and of the leaves. This is due, apparently, to a response to environmental conditions, moisture being the main factor concerned. The following specimens are noteworthy in showing strongly geniculate stems and mostly thinner leaves: *Heller & Brown 5503*, *Ferris 1602* and *1626*, and *Heller 7508*. They merge into the typical condition, sometimes in the same collection, so that it does not seem desirable to consider them as varieties. *Suksdorf 480* from Washington and *Wooton 28* from New Mexico are glabrous plants, having nearly orbicular leaves and an almost entire margin.

17a. Var. **insignis** (Greene) Grant, comb. nov.

M. guttatus var. *insignis* Greene, Manual Bay Region, 277. 1894.

M. Langsdorfii var. *insignis* Greene in Jour. Bot. **33**: 7. 1895; Jepson, Fl. W. Mid. Calif. 407. 1901, and ed. 2, 379. 1911.

Stems erect, internodes elongated; leaves few, rounded, ovate, coarsely dentate, sometimes with small lobes at the base; calyx tinged and spotted with red, upper tooth usually shorter than in the species; corolla 2.5–4.5 cm. long, throat abruptly expanded and very wide.

Distribution: central valley region in California.

Specimens examined:

California: wet meadow between Mud Flat and Bennett Spring, Glenn Co., 27 April, 1916, *Heller 12344* (Cornell and M); Adobe Cañon, Sonoma Co., April, 1893, *Bioletti* (M and R. Mt.); Adobe Cañon, April, 1893, *Michener & Bioletti* (M); near Sonoma, Sonoma Co., 23 April, 1902, *Heller & Brown 5349* (Cornell, M, and Pomona); low meadows, La Lomita, Napa River Basin, 26 April, 1893, *Jepson 8m* (Calif., "the exact type" according to Jepson, and R. Mt.); near Sonoma, 18 April, 1862, *Brewer 974* (G and U. S.).

A strikingly beautiful plant, merging into the species through such specimens as *C. F. Baker 2608* from Mt. St. Helena.

17b. Var. **micranthus** (Heller) Grant, comb. nov.

M. micranthus Heller in Muhlenbergia **8**: 132. 1912.

Stems glabrous, weak, 3–6 dm. long; lower leaves long-petioled, lyrate, 6–8 cm. long, upper leaves thin, sessile, broadly orbicular, floral leaves densely white-villous on the lower surface; flowers in a short raceme, pedicels usually more than twice as long as the calyx, slender; calyx puberulent, more or less tinged and spotted with red, 8–11 mm. long in fruit, upper tooth not always 3 times as long as the others, throat sometimes slightly constricted; corolla 8–13 mm. long, less than twice the length of the calyx.

Distribution: wet places in Nevada and central California. Rarely collected.

Specimens examined:

Nevada: by a spring, Jarbridge, 6 July, 1912, *Nelson & Macbride 1959* (M and R. Mt.).

California: Metcalf's Ranch, northeast base of Mt. Eddy, 3800 ft. alt., 20 June, 1919, *Heller 13256* (M and Cornell); Alton, Humboldt Co., 9 June, 1912, *Tracy 3688* (M and R. Mt.); Yountville, Napa River Basin, 26 April, 1893, *Jepson 12m*

(Calif.); Twenty-seven Mile Drive near Congress Springs, Santa Clara Co., 13 May, 1904, *Heller 7410* (M and R. Mt., *type collection*); foothills west of Los Gatos, Santa Clara Co., 700 ft. alt., 30 April, 1908, *Heller 8936* (M and Stanford); foothills near Stanford University, 2 May, 1902, *C. F. Baker 881* (Pomona).

18. **M. laciniatus** Gray in Proc. Am. Acad. **11**: 98. 1876; Bot. Calif. **1**: 567. 1876; Syn. Fl. N. Am. **2**^{1}: 277. 1878, ed. 2, and Suppl. 449. 1886; Greene in Bull. Calif. Acad. Sci. **1**: 114. 1885; Hall, Yosemite Fl. 221. 1912.

M. Eisenii Kell. in Proc. Calif. Acad. Sci. **7**: 89. 1877.

A nearly glabrous annual; stem erect or ascending, freely branched from the base, 3–35 cm. high, terete or somewhat quadrangular, often tinged with red; leaves few, 1–5 cm. long, mostly long-petioled, 1-nerved, variously cut, lobed or pinnately-parted, the apex obtuse, basal leaves generally numerous and in a rosette; pedicels slender, longer than the leaves, glandular-puberulent at the base, erect in flower, becoming recurved when mature, the fruiting calyx often standing at right angles to the pedicels and about half their length; calyx oblong, .5–1.5 cm. long, more or less spotted with reddish-purple, the angles tinged with the same color, villous with shaggy white hairs below the sinuses, teeth triangular-acute, the upper one little over twice the length of the others; corolla .7–1.8 cm. long, usually with a single large reddish-brown spot on the middle lobe of the lower lip, sometimes with smaller dots below; stigma-lips unequal, style puberulent; capsule short-stipitate, oblong.

Distribution: in more or less open moist patches in granite sand or in rocky places. Collected only in the Sierra Nevada Mountains from Tuolumne Co. to Fresno Co., California.

Specimens examined:

California: in damp rocky places, Strawberry Lake, Tuolumne Co., 10 June, 1917, *A. L. Grant 951* (G, U. S., Cornell, Ore., Stanford, and Pomona); in damp granite sand, Hog Ranch, above Hetch-Hetchy Valley, Tuolumne Co., 4700 ft. alt., 16 June, 1917, *A. L. Grant 997* (N. Y., Phil., Cornell, M, R. Mt., Calif. Acad., and Calif.); in damp granite sand, Hog Ranch, Tuolumne Co., 4700 ft. alt., 14 June, 1917, *A. L. Grant 983* (G, Cornell, M, Ore., and Calif.); on a branch of the Merced at Clark's (now Wawona), 1872, *Sullivan & Gray* (G, TYPE); Merced River, 4 miles below Yosemite, Aug., 1883, *Meehan* (G and M); Yosemite Falls, 5300 ft. alt., 25 June, 1911, *Jepson 4274* (Calif.); Cloud's Rest, Yosemite, 1883, *Curran* (G); foot of Yosemite Falls, 22 June, 1911, *Abrams 4485* (Stanford); Pine Ridge, Fresno Co., 5300 ft. alt., 15–25 June, 1900, *Hall & Chandler 123* (M and Stanford); river bed of the Marble Fork, Sequoia Park, about 5500 ft. alt., 24 June, 1900, *Jepson 658* (Calif.); no data, *Eisen* (Calif. Acad.).

The irregularly lobed leaves of *M. laciniatus* readily separate it from the other species in this section. Depauperate forms sometimes show little lobing of the leaves and may cause such plants to be confused with *M. nasutus*.

19. M. Whipplei Grant[1]

A small more or less glandular-villous annual, much branched from the base; branches numerous, simple, 10–15 cm. high; leaves broadly ovate, acute, coarsely dentate, 3–5-nerved from the base, lower leaves petioled, 1.5–3 cm. long, .6–1.5 cm. wide; pedicels slender, at least twice as long as the leaves; calyx campanulate, 6–7 mm. long, slightly inflated in fruit, teeth broadly triangular-acute, unequal, the upper scarcely twice the length of the others, villous at the sinuses, often spotted with red; corolla campanulate, 1.8–2.2 cm. long, yellow, tube exserted, throat short, expanding abruptly at the wide limb, 1.5–2 cm. broad, lobes unequal, broad, rounded, the lower lip exceeding the upper; stamens included, filaments minutely puberulent, anthers glabrous, anther-cells coherent nearly half their length; style glabrous; stigma-lips unequal; capsule about one-half as long as the calyx-tube, subglobose, compressed, stipitate by a broad base; seeds oblong, papillate.

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[1] **Mimulus Whipplei** Grant, sp. nov., annuus, ad basim multo-ramosus; ramis simplicibus, 10–15 cm. altis; foliis late ovatis, acutis, grosse dentatis; calyce 6–7 mm. longo, dente supremo alteris valde duplo longiore; corolla 1.8–2.2 cm. longa, flava, limbo, 1.5–2 cm. lato; capsula subglobosa, stipitata.—Collected on hillsides and rocky places, Murphy's, Calaveras Co., 14 May, 1854, *Bigelow* (Gray Herb., TYPE, and U. S. Nat. Herb.).

Distribution: known only from the type locality.

Specimens examined:

California: hillsides and rocky places, Murphy's, Calaveras Co., 14 May, 1854, *Bigelow* (G, TYPE, and U. S.).

20. M. pallens Greene, Leafl. Bot. Obs. & Crit. **2:** 4. 1909.

A small glabrous annual; stem 2–8 cm. long, slender, freely branched, internodes elongated; leaves pale-green, few, broadly obovate, spatulate or suborbicular, 4–14 mm. long, thin, nearly entire or sparingly and irregularly dentate, the lower with winged petioles, upper sessile; flowers in a short loose raceme or terminal, pedicels mostly three or more times the length of the corolla, almost filiform; mature calyx usually 3-toothed, oval, 4–8 mm. long, teeth broadly triangular, obtuse, the two lower occasionally cleft at the apex, and folded toward the very large upper one, nearly closing the orifice, sinuses broad; corolla funnelform, .8–1.5 cm. long, tube slender, exserted, lobes rounded, unequal; style glabrous, scarcely longer than the mature calyx, stigma-lips nearly elliptical, unequal; capsule oblong, acute, about one-third the length of the calyx, short-stipitate; seeds oblong, longitudinally wrinkled.

Distribution: wet places in northern Mexico.

Specimens examined:

Chihuahua: springy places, Sierra Madre, 29 Sept., 1887, *Pringle 1347* (Phil.); near Colonia Garcia in the Sierra Madre, 7400 ft. alt., 12 Sept., 1899, *Townsend & Barber 324* (M and Phil.).

Durango: Santiago Papasquiaro, April and August, 1896, *Edw. Palmer 55* (U. S., TYPE, and M); San Ramon, 21 April–18 May, 1906, *Edw. Palmer 87* (M and Phil.).

21. M. dentilobus Rob. & Fern. in Proc. Am. Acad. **30:** 120. 1895; Conzatti & Smith, Fl. Sin. Mex. 117. 1897.

M. parvulus Woot. & Standl. Contr. U. S. Nat. Herb. **16:** 171. 1913; **19:** 587. 1915.

Low creeping plants, rooting from the nodes and forming dense mats; stems 3–5 cm. high, slender, terete, nearly glabrous or sparsely pubescent; leaves broadly ovate or suborbicular, 2–7 mm. long, 2–5 mm. wide, dentate, crenate or nearly entire, mostly with winged petioles, shorter than the blade, more or less covered with stiff white hairs; flowers few, axillary or terminal, pedicels pubescent, slender, almost filiform, much exceeding the leaves; mature calyx turbinate, 5–7 mm. long, sparsely pubescent, rarely glabrous, teeth triangular-acute, the lower and upper teeth longer than the lateral ones, folding over and nearly closing the orifice; corolla 9–13 mm. long, throat spotted with red below the lower lip, lobes erose or somewhat laciniate; style puberulent or glabrous; capsule oblong, less than half the length of the calyx, compressed, not stipitate; seeds brownish, oval, sometimes 3-sided, longitudinally striate and often bearing stiff scattered hairs.

Distribution: in wet places in southwestern New Mexico, and in northern Sonora and Lower California. Rarely collected.

Specimens examined:

New Mexico: Rocky Canyon, Grant Co., 29 Aug., 1911, *Holzinger* (M); Rocky Canyon, 9 Aug., 1911, *Holzinger* (U. S.).

Mexico:

Sonora: Nacori, 3750 ft. alt., 4 Dec., 1890, *Hartman 288* (G, TYPE); Bavispe River, 23 Dec., 1890, *Lloyd 440* (G and Calif.).

Lower California: Puerto Escondido in Sierra Giganta, back of Bay, about 1700 ft. alt., 14 June, 1921, *I. M. Johnston 4113* (Calif. Acad.).

A curious *Mimulus*, unlike the other species because of its hairy leaves, the shape of the mature calyx, the erose or laciniately lobed corolla, and the seeds.

22. **M. crinitus** Grant, nom. nov.

M. acutidens Reiche, Fl. Chile 6¹: 63. 1911, not Greene.

Plants hairy; stems weak, diffuse; leaves ovate, acute, 6–7 cm. long, thin, short-petioled; pedicels shorter than the leaves; calyx cylindrical, 1–1.5 cm. long, teeth linear, subulate, the upper tooth larger; corolla 2–2.4 cm. long, yellow; capsule unknown.

Distribution: swamps in the Province of Valdivia, Chile.

Specimens of this species have not been seen by the writer, and the above diagnosis is compiled from the original description.

23. **M. depressus** Phil. Fl. Atac. 45. 1860; Reiche, Fl. Chile 6¹: 62. 1911.

A low glabrous perennial; stems short; leaves in a basal rosette, crowded, ovate, short-petioled, 3–4 cm. long, 2–2.5 cm. broad, serrate-dentate, short-petioled, blade with a transverse dark bar; flowers subsessile, crowded at the apex of the stem; calyx 4–5 mm. long; corolla 1.4–1.5 cm. long, not spotted.

Distribution: in swamps in the high mountains in Atacama and Coquimbo, Chile.

23a. Var. **nanus** (Phil.) Reiche, Fl. Chile **6**^{1}: 62. 1911.

M. nanus Phil. Fl. Atac. 45. 1860, not Hook. & Arn.

Plants small; stems scarcely 2.5 cm. high, mostly 1-flowered; leaves ovate, 5 mm. long, entire, short-petioled; corolla 6 mm. long.

Distribution: in wet places in the Sandon Valley in the desert of Atacama, Chile.

These plants are known to the writer only from the descriptions cited above. The variety was originally described from five plants collected by a spring in the Sandon Valley, Chile. It may be a depauperate form of the species or examination of authentic material may show it to be specifically distinct.

24. M. pilosiusculus HBK. Nov. Gen. & Sp. **2**: 370. 1817; Benth. in DC. Prodr. **10**: 371. 1846; McCloskie in Princeton Patagonia Exp. **8**^{2}: 721. 1903–1906.

M. sylvaticus Phil. in Linnaea **30**: 197. 1859–60; Reiche, Fl. Chile **6**^{1}: 62. 1911.

A low pubescent perennial with stems .5–1.5 cm. long, procumbent or creeping, freely branched; leaves numerous, mostly crowded, the lower short-petiolate, broadly ovate or oblong-ovate, 1.6–1.8 cm. long, 6–12 mm. wide, acute or obtuse, irregularly dentate, pale green, the upper sessile or short-petioled; flowers axillary, numerous, pedicels slender, mostly shorter than the leaves; calyx 5–6 mm. long, inflated and oval when mature, 6–8 mm. long, the throat slightly constricted, teeth spreading, broadly triangular-acute, the upper longer and much broader; corolla 1–1.4 cm. long; capsule oblong, almost as long as the calyx-tube, not stipitate; seeds smooth, oval, nearly as broad as long.

Distribution: Peru, Chile, and Argentine Republic.

Specimens examined:

Chile: Quillota, without date or collector (G).

Argentine Republic: General Roca and vicinity, Rio Negro Valley, 750–1100 ft. alt., 19 Jan., 1915, *Fischer 266* (U. S., Cornell, and M).

This plant is closely related to *M. glabratus* and may be only a pubescent, short-pedicelled form of that species.

25. **M. glabratus** HBK. Nov. Gen. & Sp. **2**: 370. 1817; Benth. Scroph. Ind. 28. 1835; DC. Prodr. **10**: 371. 1846; Gray in Bot. Mex. Bound. 116. 1859; Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 447. 1886; Conzatti & Smith, Fl. Sin. Mex. 117. 1897.

M. andicolus HBK. Nov. Gen. & Sp. **2**: 370. 1817.

M. Jamesii var. *texensis* Gray, Syn. Fl. N. Am. **2**^{1}: 277. 1878, and ed. 2, 1886; Greene in Bull. Calif. Acad. Sci. **1**: 118. 1885.

M. tener Phil. in Anal. Mus. Nac. Chile **1**: 70. 1891; Reiche, Fl. Chile **6**^{1}: 64. 1911.

A low perennial, glabrous or nearly so, aquatic or semi-aquatic, stoloniferous or with creeping stems which root freely at the lower nodes; stems usually numerous, hollow, weak, 1–4 cm. long; leaves broadly ovate, 1.5–5 cm. long, .8–3 cm. broad, irregularly dentate, sometimes shallowly lobed at the base, 3–5-nerved, basal leaves cuneate, subcordate or with margined petioles, these usually shorter than the blade, upper leaves subcordate, sessile; flowers axillary, chiefly along the upper parts of the stem, pedicels slender, nearly filiform in some specimens, longer or shorter than the leaves; calyx campanulate, often spotted or tinged with red, 5–8 mm. long, broadly oval in fruit, 1–1.2 cm. long, teeth broad, spreading, very short, the upper tooth 2 or more times longer than the others, all broadly rounded, sometimes mucronate, the apex appearing acute only when folded, throat little, if at all, constricted; corolla tubular, .7–1.5 cm. long, tube slender, lower lip heavily bearded, middle lobe much longer than the lateral ones; style glabrous; capsule oblong, rounded, constricted at the base, not stipitate, shorter than the calyx-tube; seeds oval, longitudinally striate.

Distribution: in shallow water or muddy places; the stems floating or creeping and more or less procumbent. Oklahoma to Bolivia.

Specimens examined:

Oklahoma: in shallow running water, Thackerville, Love Co., 15 April, 1913, *Stevens 63* (M).

Texas: New Braunfels, Aug., 1851, *Lindheimer 717* (M); along the streams, San Saba, April, 1882, *Reverchon 1341* (M and Stanford); rocky pool margins, Spring Creek, San Saba Co., 4 May, 1917, *E. J. Palmer 11793* (M); Austin, April, 1848, *Wright* (G); river bank, Austin, 13 May, 1872, *E. Hall 410* (M); Limpia Cañon, western Texas, 25 April, 1902, *Tracy & Earle 220* (Cornell and M).

New Mexico: copper mines, 1851–52, *Wright 1482* (G and M).

Mexico:

Coahuila: Saltillo, 1898, *Edw. Palmer 124* (M).

Sonora: Sonora, 1890, *Lloyd 438* (G).

Durango: in wet places, Nombre de Dios, near the city of Durango, April, 1896, *Edw. Palmer 104* (G and M); common in water and wet places near the city of Durango, June, 1896, *Edw. Palmer 164* (G and M).

San Luis Potosi: Alvarez, 28 Sept.–3 Oct., 1902, *Edw. Palme 179* (M).

Mexico: Ixtaccihuatl, 10000–11000 ft. alt., March–July, 1903, *Purpus 327* (M and Pomona); about Mexico, *Berlandier 781* (M).

Hidalgo: by brooks, barranca below Trinidad Iron Works, 5500 ft. alt., 22 Aug., 1904, *Pringle 13149* (G, U. S., and Cornell).

Michoacan: on rocks of aqueduct near Chapultepec, 16 April, 1849, *J. Gregg* (M).

Puebla: Route de Chohila, vicinity of Puebla, about 7300 ft. alt., 14 March, 1907, *Bro. Arsène* (M).

Oaxaca: Sierra de San Felipe, 10000 ft. alt., Sept., 1894, *C. L. Smith 406a* (M).

Chiapas: Chiapas, 1864–70, *Ghiesbreght 682* (M).

Central America:

Guatemala: Dueñas, Dept. Zacatepequez, 5000 ft. alt., April, 1890, *J. D. Smith 2127* (G and U. S.).

South America:

Colombia: ditch in field, Rio San Cristobal, near Bogotá, 20–26 Sept., 1917, *Pennell 2194* (M); in ditch, San Cristobal, Bogotá, about 8500 ft. alt., 30 Sept., 1917, *Pennell 2279* (M); springhead in meadow, Zipaquira, Cundinamarca, 20–24 Oct., 1917, *Pennell 2533* (M).

Ecuador: Quitensian Andes, 1855, *Couthouy* (G); in the Andes Mts., 1857–59, *Spruce 5168* (G).

Bolivia: vicinity of Cochabamba, 1891, *Britton & Rusby 1014* (M); Bermejo, 16 Nov., 1903, *Fiebrig 2077* (G).

Argentine Republic: common in creeks, Andalgalia, 11 Sept., 1915, *Jörgensen 980* (M); Cordillera del Chubut, Corcobado River, Feb., 1903, *Illin 165* (Calif.); La Cienaga, Sierra de Tucaman, 17 Nov., 1874, *Hieronymus & Lorentz 719* (U. S.).

While *M. glabratus* is closely allied to *M. guttatus*, it can readily be distinguished from that species by the shape of the mature calyx. This is broadly campanulate and the teeth do not fold over, closing the orifice. All of the teeth, except the upper one, are very short, sometimes hardly more than mucronate, giving a characteristic short stubby appearance to the fruiting parts. Variations occur, however, and in some specimens we find good-sized blunt teeth, all shorter than the upper one. Ordinarily, the plants are glabrous, but numerous specimens show a well-developed pubescence at the nodes, on the upper part of the stem and on the pedicels. This species and its varieties form the most widely distributed group in the genus, occurring from southern Canada, through Mexico and Central America to Rio Negro in Argentine Republic.

25a. Var. **Fremontii** (Benth.) Grant, comb. nov.

M. Jamesii var. *Fremontii* Benth. in DC. Prodr. **10**: 371. 1846.

M. Geyeri Torr. in Nicoll. Rept. Miss. 157. 1843; Nelson in Coulter & Nelson, Manual Cent. Rocky Mountains, 454. 1909; Woot. & Standl. Contr. U. S. Nat. Herb. **19**: 587. 1915; Rydb. Fl. Rocky Mountains, 779. 1917; Britton & Brown, Ill. Fl. ed. 2, **3**: 191, *fig. 3778*. 1913.

M. Jamesii Torr. & Gray in Benth. DC. Prodr. **10**: 371. 1846; Gray, Syn. Fl. N. Am. 2^1: 276. 1878, and ed. 2, 1886; Greene in Bull. Calif. Acad. Sci. **1**: 118. 1885; Britton & Brown, Ill. Fl. **3**: 158, *fig. 3268*. 1896; Britton, Manual, 828. 1901, and ed. 2, 1905; Conzatti & Smith, Fl. Sin. Mex. 117. 1897. Small, Fl. Southeastern U. S. 1063. 1903.

M. reniformis Engelm. ex Benth. in DC. Prodr. **10**: 371. 1846.

M. madrensis Seem. in Bot. Herald, 322, *pl. 58.* 1852–57.

M. glabratus var. *Jamesii* Gray, Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 447. 1886; Robinson & Fernald in Gray, Manual, ed. 7, 723. 1908.

M. inamoenus Greene, Pittonia **5**: 137. 1903.

Leaves mostly suborbicular, oval with a rounded apex and subcordate base or occasionally nearly reniform, margin entire, undulate, denticulate or irregularly and sparsely dentate; pedicels and calyx often pubescent.

Distribution: common in shallow water or in muddy places, through central North America from Manitoba to Mexico, west to Montana, Nevada and Arizona; apparently a calcophile.

Specimens examined:

Manitoba: river bank, growing in running water, Aweme, 5 Aug., 1905, *Criddle* (M).

Michigan: in water at outlet of spring, Black Lake, Cheboygan, 20 Aug., 1890, *Kofoid* (M); aquatic herb in Carp Creek, near Douglas Lake, Cheboygan Co., 21 July, 1917, *Gates & Gates 10618* (M).

Wisconsin: Delavan Lake, Walworth Co., 14 June, 1896, *Skeels* (Cornell); St. Croix Falls, Polk Co., 7 Aug., 1900, *C. F. Baker* (Pomona).

Illinois: Peoria, 1859, *Brendel* (M).

Minnesota: Minnehaha Falls, 12 Aug., 1886, *Wislizenus 561* (M); Minneapolis, 17 Aug., 1873, *Herrick 33* (M); Cannon Falls, July, 1891, *Sandberg 376* (Stanford).

Iowa: limestone springs, Clinton Co., 1 July, 1878, *Butler 24* (M); in clear running water near the Missouri River, 27 May, 1920, *James* (N. Y.).

Missouri: Springfield, 5 May, 1888, *Blankinship* (M); in springs, Barry Co., 15 Aug., 1895, *Blankinship* (R. Mt.); wet limestone ledges about spring, bluffs of Mississippi River near Ste. Genevieve, 25 June, 1920, *E. J. Palmer 18035* (M).

North Dakota: in mud and water, Kathryn, 18 July, 1912, *Bergman 2290* (M); in springs at end of Lake, Stump Lake Springs, 25 July, 1911, *Tufte 227* (R. Mt.); Devil's Lake, Nicollet's Northwestern Exp., 1 Aug., 1839, *Geyer 119* (N. Y. and M).

South Dakota: banks of stream in Rapid Creek Canyon, Rapid City, 19 Aug., 1891, *T. A. Williams* (M); Big Stone Lake, Aug., 1892, *T. A. Williams* (M).

Nebraska: wet places, Jim Creek, Hot Creek Basin, 4500 ft. alt., 24 June, 1890, *T. A. Williams* (M); in streams and brooks, Halsey, 10 June, 1903, *Mell & Knopf* (M); Thedford, 7 Aug., 1889, *Webber* (M); Franklin, 2000 ft. alt., 17 May, 1893, *Laybourn 16* (M); Chelsea, Holt Co., 4 Aug., 1893, *Clements 2969* (Cornell).

Kansas: bogs, Riley Co., 21 May, 1895, *Norton 379* (M and R. Mt.); Arlington, 31 July, 1899, *White 81* (M); St. George, 30 May, 1892, *Hitchcock* (M); Manhattan, Riley Co., 10 May, 1894, *Kellerman* (M).

Oklahoma: Garfield Co., 27 June, 1900, *White 149* (M); in shallow pond, near Doby Springs, Harper Co., 5 May, 1913, *Stevens 318* (M); in edge of creek near Knowles, Beaver Co., 5 May, 1913, *Stevens 330* (M); in edge of spring, near Cleo, Major Co., 8 June, 1913, *Stevens 782* (M); in edge of small creek, near Alva, Woods Co., 16 April, 1914, *Stevens 3010* (M); Woods Co., 28 June, 1900, *White 6* (M and R. Mt.).

Texas: seepy loam slope, Austin, 15–16 May, 1920, *Pennell 10444* (M); base of Glouse Mt., May, 1884, *Reverchon* (M); abundant in spring water, Pinto Canyon, near Rindosa, 13 April, 1919, *Hansen 590* (M).

Montana: Missoula, 10 Sept., 1898, *Griffith* (M).

Wyoming: P. F. Ranch, Pratt, Converse Co., 25 Aug., 1901, *H. B. Baker 30* (M); in a spring pool, Platt River, Natrona Co., 27 June, 1901, *Goodding 130* (Cornell, M, R. Mt., Stanford, and Pomona); in margin of stream, Wendover, 22 Aug., 1910, *Nelson 9545* (M and R. Mt.); Whalen Cañon, 19 July, 1894, *Nelson 543* (Cornell, M, and R. Mt.); in a spring bog, Badger, Laramie Co., 1 July, 1901, *Nelson 8344* (Cornell, M, and R. Mt.).

Colorado: Pole Creek to South Platt, Lieut. Bryan's Exp., 1856, *Engelmann* (G and M); Rocky Mt. Flora, 1862, *Hall & Harbour 399* (Cornell and M); New Windsor, Weld Co., 26 Aug., 1902, *Osterhout 2716* (R. Mt. and Pomona); along the Platt River, Denver, 12 June, 1878, *Jones 212* (M); wet springy places near Riverside, Denver Co., 15 July, 1915, *Munz 137* (Cornell); swamp near Greeley, 28 June, 1907, *E. L. Johnson 120* (M); swampy creek banks, Paradox, Montrose Co., 5400 ft. alt., 19 June, 1912, *Walker 118* (R. Mt.); Cuchara Valley near La Veta, 17 May, 1900, *Rydberg & Vreeland 5659* (R. Mt.); Wray Yuma Co., 23 June, 1915, *Osterhout 5253* (R. Mt.).

Utah: in a swamp near Utah Lake, 18 Sept., 1858, Lieut. Bryan's Exp., *Hayden* (M).

Nevada: Reno, Sept., 1888, *K. Brandegee* G and M); Reno, Sept., 1888, *T. S. Brandegee* (U. S.).

New Mexico: Mangos Springs, near Silver City, Grant Co., 4770 ft. alt., 27 June, 1903, *Metcalfe 208* (G); Bear Mt. near Silver City, Grant Co., near 5000 ft. alt., 24 April, 1903, *Metcalfe 28* (M); in the water of springs and rivulets, Santa Fe, May and June, 1847, *Fendler 559* (M); Cold Spring, 4 Sept., 1895, *Mulford 1152* (M); by spring, 10 miles west of Datil, Datil Nat'l Forest, Socorro Co., 8400 ft. alt., 3 July, 1918, *Ferris 1204* (Stanford); in running water, Bear Spring, Sandia Mts., 6000 ft. alt., Aug.–Sept., 1911, *Ellis 294* (M).

Arizona: Chiricahua Mts., 10 April, 1894, *Price* (Stanford).

Mexico:

Coahuila: water plant, Saltillo, 22 March, 1847, *Gregg 331* (M); in water, Saltillo, 6 March, 1847, *Gregg 195* (M); marshy place at San Juan de la Vacqueria, 20 May, 1847, *Gregg 716* (M).

Chihuahua: vicinity of Chihuahua, 5–10 June, 1908, *Edw. Palmer 366* (M); vicinity of Chihuahua, 1–21 May, 1908, *Edw. Palmer 162* (G and M).

Durango: Tobar, 28–31 May, 1906, *Edw. Palmer 235* (M).

Vera Cruz: Citlaltepetl, 12000–13000 ft. alt., Sept., 1907, *Purpus 2805* (M).

Queretaro: Queretaro, about 5500 ft. alt., 1910, *Bro. Aguiel 10254* (M).

Michoacan: Cerro San Miguel, near Morelia, about 6600 ft. alt., Dec., 1910, *Bro. Arsène 5310* (M); vicinity of Morelia, 2 Feb., 1912, *Bro. Arsène 9936* (G and M).

This variety can usually be distinguished by the suborbicular shape of its leaves with entire or sparsely and irregularly denticulate margins. Many intermediates occur, as *Tracy & Earle 220* from Texas, *Palmer 104* and *164* from Mexico, *Berlandier 781* from Mexico, and *Stevens 330* from Oklahoma. In some of these specimens, it was difficult to decide whether the plants belonged to the species or to the variety, so closely were they associated. The specimens of Mr. and Mrs. T. S. Brandegee from Reno, Nevada, are worthy of special mention in that the upper parts are decidedly viscid-pubescent. Mrs. Brandegee says that plants with an occasional sterile fifth filament were found among the specimens in this collection.

25b. Var. **parviflorus** (Lindl.) Grant, comb. nov.

M. parviflorus Lindl. Bot. Reg. *pl. 874.* 1825; Trans. Hort. Soc. London **6**: 294. 1826; Benth. Scroph. Ind. 28. 1835; DC. Prodr. **10**: 371. 1846; Clos in C. Gay, Hist. Chile **5**: 141. 1849.

M. propinquus Lindl. Bot. Reg. *pl. 1330.* 1830; Hook. Fl. Bor. Am. **2**: 99. 1840; Benth. in DC. Prodr. **10**: 371. 1846.

M. luteus var. *micranthus* Phil. in Linnaea **29**: 28. 1857–58; Reiche, Fl. Chile **6**^{1}: 60. 1911.

M. Kingii Phil. in Anal. Univ. Chile **43**: 528. 1873; Reiche, Fl. Chile **6**^{1}: 61. 1911.

Creeping or procumbent annuals, freely rooting at the lower nodes, more or less pubescent above; stems terete; leaves broadly ovate, base subcordate or nearly truncate, lower leaves tapering to margined petioles, upper leaves sessile; calyx-teeth short, triangular-acute, upper at least twice as long as the others; corolla tubular, usually less than twice the length of the calyx, throat dotted with red.

Distribution: in wet places in Chile and Argentine Republic. Specimens scarce in American herbaria.

Specimens examined:

South America:

Chile: Province de Chile, without date, *C. Gay* (G); near Santiago, 1899, *Najarre* (Cornell); Valparaiso, without date, *Mertens* (M); Desert of Atacama, Sept.–Oct., 1890, *Morong 1213* (G and Phil.).

Argentine Republic: Andes of Mendoza, without date, *Gillies* (G); Uspallata near Mendoza, 1825, *Gillies* (G).

The original description and plate of *M. parviflorus* correspond so closely with *M. glabratus* that even with the limited material at hand the writer has no hesitation in regarding it as a mere variation of *M. glabratus*, separated mainly by the extent of the pubescence. Additional material may show the two to be conspecific. Lindley said that *M. parviflorus* differed from *M. glabratus* in not having square stems and in being hairy but this does not hold. The amount of hairiness is variable. Plants grown from seed of Jörgensen's collection no. 980 from Argentine Republic showed much diversity: some of the plants were glabrous, some had distinctly pubescent petioles, pedicels, and calyces, and some were merely puberulent. In this section, annual or perennial characters seem to be largely dependent on the amount of water present and the conditions under which the individual plants are growing, so that these could not be used for specific diagnosis unless accompanied by other more important differences.

SECTION 4. PARADANTHUS Grant

§ 4. PARADANTHUS Grant, new section.

§ *Eumimulus* Gray, Syn. Fl. N. Am. 2. ed. 2, 2[1]: Suppl. 446. 1886, in part.

§ *Simiolus* Greene in Bull. Calif. Acad. Sci. **1**: 109. 1885, in part.

Annuals or perennials, glabrous, glandular, viscid-pubescent or slimy-villous; calyx campanulate, occasionally inflated in fruit, rarely with corky ribs, teeth equal or nearly so; corolla mostly funnelform, sometimes bilabiate, throat commonly ampliate, lobes equal or unequal, pink, reddish-purple, yellow, or blue, rarely white; stamens usually included; style glabrous or pubescent, stigma-lips equal or unequal; capsule dehiscent to the base along both sutures, placentae completely united, separated at the apex or occasionally divided to the middle and adherent to the valves. Sp. 26–69.

KEY TO THE SPECIES

A. Mature calyx strongly inflated.
  a. Style shorter than the ovary.
    α. Corolla less than 7 mm. long........................*30. M. breviflorus*
    β. Corolla more than 9 mm. long........................*31. M. latidens*

b. Style longer than the ovary.
α. Calyx-teeth short, giving a truncate appearance when in fruit.
I. Pedicels less than twice as long as the leaves.
1. Anthers glabrous.
* Leaves sessile..............................*36. M. Bodinieri*
** Leaves petioled...........................*35. M. nepalensis*
2. Anthers villous.
* Corolla more than 1.2 cm. long.
† Pedicels longer than the leaves................*32. M. acutidens*
†† Pedicels shorter than the leaves.................*33. M. Grayi*
** Corolla less than 1.2 cm. long ....*34. M. inconspicuus*
II. Pedicels more than twice as long as the leaves......*39. M. Bridgesii*
β. Calyx-teeth distinct, not giving a truncate appearance when in fruit.
I. Leaves mostly ovate, dentate....................*44. M. floribundus*
II. Leaves mostly elliptical, entire or sparingly denticulate..*43. M. arenarius*
B. Mature calyx little or not at all inflated, sometimes distended by the mature capsule.
a. Corolla-lobes distinctly unequal.
α. Low prostrate perennials.
I. Stems creeping, rooting freely at the nodes.
1. Stems succulent.
* Leaves sessile......................................*26. M. repens*
** Leaves petioled............................*27. M. orbicularis*
2. Stems not succulent.
* Leaves narrowly oblong.
† Pedicels shorter than the leaves..............*28. M. prostratus*
†† Pedicels much longer than the leaves............*29. M. pusillus*
** Leaves broadly ovate........................*49. M. pachystylus*
II. Stems decumbent, producing runners......*45. M. jungermannioides*
β. Stems more or less erect, mostly annuals.
I. Calyx-throat oblique.
1. Calyx-teeth subequal.
* Leaves short-petioled; anthers bearded............*38. M. dentatus*
** Leaves sessile, anthers glabrous..............*37. M. sessilifolius*
2. Calyx-teeth unequal, the two lower teeth longer than the three others ....*48. M. alsinoides*
II. Calyx-throat not oblique.
1. Mature calyx with corky ribs.............................*55. M. bicolor*
2. Mature calyx without corky ribs.
* Style pubescent.
† Internodes shorter than the leaves; corolla reddish-purple..............................*62. M. purpureus*
†† Internodes longer than the leaves; corolla yellow ....*41. M. washingtonensis*
** Style glabrous.
† Leaves distinctly petioled.
‡ Leaves narrowly oblong..................*40. M. Pulsiferae*
‡‡ Leaves ovate.
§ Stems viscid-puberulent.................*42. M. ampliatus*
§§ Stems viscid-villous.......................*50. M. Dudleyi*

†† Leaves sessile.
‡ Anthers hispid..............................*64. M. discolor*
‡‡ Anthers glabrous.
§ Corolla-lobes narrow, emarginate............*66. M. deflexus*
§§ Corolla-lobes broad, not emarginate.
0 Pedicels much exceeding the leaves; corolla rose-purple..............................*59. M. gracilipes*
00 Pedicels rarely exceeding the leaves; corolla yellow..............................*65. M. montioides*
b. Corolla-lobes equal or subequal.
α. Perennials.
I. Flowers solitary, scapose.......................*54. M. primuloides*
II. Flowers racemose.
1. Plants glabrous or nearly so; anthers glabrous....*47. M. Leibergii*
2. Plants not glabrous; anthers bearded.
* Stems glandular-pubescent; corolla red or pink.
† Stems erect; corolla pink.........................*52. M. Lewisii*
†† Stems prostrate; corolla red................*53. M. Eastwoodiae*
** Stems more or less slimy; corolla yellow........*46. M. moschatus*
β. Annuals.
I. Calyx-ribs corky when mature.......................*56. M. Bioletti*
II. Calyx-ribs not corky.
1. Anthers hispid.
* Calyx-teeth equal, ciliate.........................*57. M. Palmeri*
** Calyx-teeth unequal, glabrous...................*58. M. filicaulis*
2. Anthers glabrous.
* Pedicels at least 3 times the length of the leaves.
† Corolla more than 1 cm. long....................*61. M. diffusus*
†† Corolla less than 1 cm. long.
‡ Capsule longer than the calyx................*63. M. exiguus*
‡‡ Capsule shorter than the calyx............*60. M. androsaceus*
** Pedicels less than 3 times the length of the leaves.
† Plants glandular-pubescent or glandular-villous.
‡ Stems stout, 1.5–4 dm. high...................*51. M. Parishii*
‡‡ Stems slender, 2–15 cm. high..................*67. M. Breweri*
†† Plants glabrous or minutely-puberulent.
‡ Calyx-teeth glabrous; stigma-lobes unequal..*68. M. Suksdorfii*
‡‡ Calyx-teeth mostly ciliate; stigma-lobes equal..*69. M. rubellus*

26. M. repens R. Br. Prodr. 439. 1810, and 123. 1821; Benth. Scroph. Ind. 29. 1835; DC. Prodr. **10:** 373. 1846; Benth. & Mueller, Fl. Austr. **4:** 482. 1869; Hooker in Curtis, Bot. Mag. III. **20:** *pl. 5423.* 1864; Moore, Fl. New South Wales, 337. 1893; Rodway, Fl. Tasmania, 138. 1903; Cheeseman, Fl. New Zealand, 484. 1906.

M. Colensoi Kirk in Trans. N. Z. Inst. **3:** 179. 1871.

A low-growing, glabrous, succulent perennial; stems 3–10 cm.

long, stout, creeping, rooting from the nodes, freely branching, the branches prostrate or ascending; internodes shorter than the leaves; leaves numerous, broadly oblong or oval, obtuse, 2–4 mm. long, 1–3 mm. wide, thick, entire, sessile by a broad base, 1-nerved, often with smaller leaves fascicled in the axils, pitted when dry; flowers few, axillary and solitary, pedicels stout, rarely exceeding the leaves; calyx narrowly campanulate, 4 mm. long, ribs and teeth green with a reddish-purple crenate lobe between, much distended by the mature capsule, teeth equal, short, triangular-acute; corolla broadly funnelform, 1.2–1.5 cm. long, blue or lilac, tube paler in color, sometimes nearly white, exserted, expanding abruptly to a wide throat, lobes long, broad, wavy-margined, unequal, the lower lip pale lilac, with a yellow area down the throat, this densely hairy and spotted with red, palate prominent, partly closing the throat; stamens included, glabrous, the filaments enlarged at the base; style glabrous, as long as the throat, sometimes with a thickened knob at the base, stigma-lips oblong, equal; capsule included, obtuse, constricted below, dehiscent along the upper suture and part way down the lower, placentae adherent to the apex; seeds oval, longitudinally striate.

Distribution: common in salt marshes and muddy places in Australia, Tasmania, and New Zealand.

Specimens examined:

Australia: without date, *Mueller* (G, Cornell, and M).
South Australia: Port Lincoln, without date, *Schomburgh* (U. S.).
Victoria: Point Lonsdale, Oct.–Nov., 1912, *Tilden 726* (G and M); Upper Yarra, Feb., 1882, *Walter* (M); Colony of Victoria, Sept., Dec., 1854, *Harvey* (G).
Tasmania: without date, *Hooker* (G).
New Zealand: Onehunga, North Island, without date, *Kirk 124* (G); Lake Ellesmere, South Island, without date, *Kirk* (M).

27. **M. orbicularis** Wall. Cat. *No. 3919.* 1828; Benth. Scroph. Ind. 29. 1835; DC. Prodr. **10**: 373. 1846; Hook. Fl. Brit. Ind. **4**: 259. 1884.

Creeping, glabrous, somewhat succulent perennials, rooting from the nodes; stems stout, 1–2.5 dm. long; leaves petiolate, thick, orbicular, 2–2.5 cm. wide, entire, not veined; pedicels shorter or as long as the leaves; calyx 6 mm. long, almost truncate, teeth very short; corolla blue, 1.2–1.8 cm. long; style stout; capsule exserted, elliptical, acute.

Distribution: southeastern India.

28. **M. prostratus** Benth. in DC. Prodr. **10**: 373. 1846; Benth. & Mueller, Fl. Austr. **4**: 483. 1869; Moore, Fl. New South Wales, 337. 1893.

A prostrate, creeping perennial; stems pubescent, 2–15 cm. long, profusely branched; leaves crowded, narrowly oblong, obtuse, 8–13 mm. long, 2–4 mm. wide, entire, sessile by a broad base, thick, 1-nerved, grayish-green, mostly glabrous; flowers axillary, solitary, pedicels pubescent, shorter than the leaves; calyx tubular, more or less pubescent, 5–6 mm. long, becoming 7–8 mm. long when mature, not inflated, teeth short, triangular-acute, sparsely ciliate; corolla 8–11 mm. long, violet, tube slender, exserted, yellow, throat broad, glabrous within, ventricose, lobes subequal, rotate, reticulately veined; stamens included, glabrous; style as long as the corolla, pubescent above, stigma peltate-funnelform, lips equal; capsule included, broadly oval, obtuse, dehiscent along both sutures, breaking away irregularly from near the base; seeds subglobose, reticulate.

Distribution: Victoria and New South Wales, Australia.

Specimens examined:

New South Wales: Nymagee, Nov., 1903, *Boorman* (Pomona); Zara, Wanganella, Dec., 1919, *Officer* (Wellesley); Tomingley to Narromine, Sept., 1898, *Maiden* (G).

Victoria: Murray River, 1871, *Mueller* (M); Swan Hill, Oct., 1888, *French* (G).

The plants of this species are very brittle when dried.

29. **M. pusillus** Benth. in DC. Prodr. **10**: 369. 1846.

Small, creeping, grayish-green perennials, densely pubescent with soft white hairs; stems freely branching, 2–3 cm. high; leaves few, narrowly oblong or oval, 1–2 mm. long, sessile, thick, obscurely 1-nerved, entire; flowers solitary, mostly terminal, with long, slender pedicels, these sometimes almost as long as the plant; calyx narrowly campanulate, 3–4 mm. long, teeth very short, triangular-acute, nearly equal, ciliate; corolla 9–10 mm. long, tube slender, much exserted, yellow, throat expanded, apparently glabrous within, slightly constricted at the apex, lobes blue, rounded, somewhat rotately spreading; stamens included, glabrous; style almost as long as the corolla, pubescent, stigma-lips broadly rounded, equal, with a laciniate margin; capsule broadly obovate, obtuse, the valves dehiscent along both sutures and breaking away near the base, placentae adherent; seeds subglobose, reticulate.

Distribution: wet places in the southern part of Australia.

Specimens examined:

New South Wales: Darling River, without date, *Mueller* (G).

30. M. breviflorus Piper in Bull. Torr. Bot. Club **28**: 45. 1901; Fl. Southeast Wash. and Adj. Idaho, 228. 1914; Howell, Fl. Northwest Am. 521. 1901; Rydb. Fl. Rocky Mountains, 779. 1917.

Stem slender, 3–15 cm. long, freely branched, branches erect or slightly spreading, puberulent; leaves rhombic-ovate or oblanceolate, .5–1.5 cm. long, 2–4 mm. wide, narrowing to a slender petiole, denticulate or rarely entire, 1–3-nerved; pedicels mostly erect, slender, usually slightly longer than the leaves, puberulent; calyx tubular, 3–5 mm. long, becoming enlarged and somewhat inflated in fruit, 5–7 mm. long, 3–4 mm. wide, teeth short, equal, deltoid-acute, frequently subulate, sparsely hispid, slightly constricted at the orifice when mature; corolla 4–7 mm. long, pale yellow, tube included, lobes nearly equal, truncate, entire; stamens filiform, included, white, glabrous; style short, glabrous, scarcely longer than the calyx, stigma-lips nearly equal; capsule included, oblong, slightly stipitate, placentae adherent to the apex; seeds oval, favose-pitted.

Distribution: wet places in Idaho, Washington, and Oregon.

Specimens examined:

Idaho: Lake Waha, Nez Perces Co., 2500–3000 ft. alt., 24 June, 1896, *Heller & Heller 3320* (Cornell, M, and Stanford); sunny stream margin, Silver City, Owyhee Co., 7000 ft. alt., 17 June, 1911, *Macbride 900* (M, R. Mt., and Stanford); Julietta, Latah Co., June, 1892, *Sandberg, MacDougal & Heller 347*

(G and Pomona); moist dirt banks, Martin, Blaine Co., 6200 ft. alt., 7 July, 1916, *Macbride & Payson 3093* (G, M, and R. Mt.); pond borders, University grounds, Moscow, 28 Aug., 1897, *Henderson 4610* (Cornell).

Washington: Rock Lake, Whitman Co., 30 May, 1893, *Sandberg & Leiberg 115* (U. S.); patches in springy places, Wawawai, Whitman Co., May, 1897, *Elmer 774* (M and R. Mt.); river bank, Bingen, Sept.–Dec., 1901, 1904, *Suksdorf 4472* (Stanford); Yakima Co., June, 1892, *Henderson 2264* (G); Yakima Region, Northern Transcontinental Survey, 1882, *T. S. Brandegee 206* (M); damp places, Falcon Valley, 2 July, 1885, *Suksdorf 485* (M and G); Pullman, 15 June, 1894, *Piper 1826* (G); Pullman, 3 July, 1894, *Piper 1858* (G, *type collection*); low sandy banks of the Columbia River, W. Klickitat Co., Sept., 1883, *Suksdorf 203* (G).

Oregon: moist fields, Hood River, 1883, *Henderson* (G); Hood River, 1884, *Barrett* (G).

31. M. latidens (Gray) Greene, Manual Bay Region, 278. 1894; Jepson, Fl. W. Mid. Calif. 406. 1902, and ed. 2, 379. 1911.

M. inconspicuus var. *latidens* Gray, Syn. Fl. N. Am. ed. 2, 2^1: Suppl. 450. 1886.

Plants glabrous or nearly so; stem 1–2.5 dm. high, simple or usually with several erect or spreading basal branches; leaves broadly ovate, 1–3 cm. long, .5–1.2 cm. broad, acute, commonly sessile, entire or obscurely toothed, thin, much longer than the internodes, basal leaves often subrosulate and short-petioled; pedicels erect, slender, reddish, sometimes obscurely puberulent, longer than the flowers and becoming much elongated in fruit; calyx cylindrical, 7–8 mm. long, accrescent, broadly oval when mature, strongly plicate and much constricted at the oblique orifice, 10–12 mm. long, 6–7 mm. broad, loosely investing the capsule; teeth 1–1.5 mm. long, triangular-acute, obscurely ciliate, connivent, nearly closing the throat; corolla 9–11 mm. long, white or yellowish, often tinged with pink, tube broad, included, throat short, broad, lobes erect, 1.5–2 mm. long, nearly equal, truncate; stamens included, glabrous, filaments slender, flat, winged; style shorter than the ovary, 1–2 mm. long; stigma-lips unequal; capsule obovate or oval, stipitate; seeds oval, papillate.

Distribution: low wet fields from northern California to Lower California.

Specimens examined:

California: Chico-Hamilton Road, 6 miles from Chico, 1 May, 1914, *Heller 11343* (Cornell, M, Ore., Calif., and Stanford); Little Chico Creek, Butte Co., 1896, *Austin 164* (M and Calif.); Lower Sacramento, 2–6 May, 1891, *Jepson* (R. Mt. and Calif.); Lower Napa Valley, 27 April, 1893, *Jepson 31m* (Calif.); Montezuma Hills, Solano Co., 14 May, 1892, *Jepson 32m* (Calif.); Bartlett Mt., May, 1884, *T. S. Brandegee* (Calif.); Little Oak, Vacaville, Solano Co., April, 1889, *Jepson 33m* (Calif.); near Mt. Diablo, 26 May, 1862, *Brewer 1161* (G, TYPE, U. S., and Calif.); Mt. Diablo, 1884, *Curran* (G); Antioch, May, 1886, *Curran* (M and Calif.); Antioch, May, 1888, *T. S. Brandegee* (Phil., M, and Stanford); Antioch, May, 1889, *T. S. Brandegee* (Calif.); Antioch, 7 April, 1885, *Davy 933* (Calif.); wet depressions in adobe, between Antioch and Marsh Creek, 5 May, 1907, *K. Brandegee* (Calif.); between San Benito River and Bitterwater, San Benito Co., 2700 ft. alt., 21 May, 1915, *H. M. Hall 9907* (Calif.); Kaweah, Tulare Co., 27 May, 1895, *Eastwood* (G); Menifee Valley, Riverside Co., 19 June, 1922, *Munz & Johnston 5378* (Pomona); Chollas, San Diego Co., 20 June, 1884, *Orcutt 1179* (G and M).

Mexico:

Lower California: Hansen's, Lower California, 7 July, 1885, *Orcutt* (M); Santo Tomas, northern Lower California, 17 April, 1886, *Orcutt* (M); mountains, Lower California, 7 July, 1885, *Orcutt* (M); Santo Tomas, northern Lower California, 21 April, 1886, *Orcutt* (M).

32. M. acutidens Greene in Bull. Calif. Acad. Sci. 1: 117. 1885; Eastwood, Fl. South Fork King's River, Sierra Club Publ. 27:66. 1902.

M. inconspicuus var. *acutidens* (Greene) Gray, Syn. Fl. N. Am. ed. 2, 2^1: Suppl. 450. 1886.

Mostly glabrous annuals; stem 7–20 cm. high, slender, erect or diffusely branched, slightly quadrangular and winged; leaves in few pairs, broadly ovate, 1–2 cm. long, 7–11 mm. wide, sessile by a broad base, thin, 3–5-nerved from the base, denticulate, occasionally hirsute, internodes 2–4 times as long as the leaves; pedicels slender, almost filiform, much longer than the leaves, curved, divaricate, often deflexed; calyx narrowly campanulate, 5–6 mm. long, in fruit chartaceous, 7–9 mm. long, 3–4 mm. wide, teeth short, triangular, sharply subulate, ciliate, equal; corolla bilabiate, 1.3–1.5 cm. long, pale pink to rose-purple, tube slightly exserted, throat narrowly funnelform, deep pink on the outside with two yellow spots below the lower lip, lobes unequal, usually emarginate, spreading, paler pink, often more or less tinged with yellow; stamens included, filaments glabrous, anthers subglobose, villous; style glabrous, included, stigma-lips equal; capsule short-stipitate, oblong, obtuse, placentae separating at the apex.

Distribution: in the foothills of the Sierra Nevada Mts., from Fresno Co. to Tulare Co., California.

Specimens examined:

California: King's River Mountains, 4000 ft. alt., April, 1877, *Eisen* (G, *type collection*); Toll House, Fresno Co., 2050 ft. alt., 13 June, 1904, *Hall & Chandler 21* (U. S., M, and Stanford); roadside between Dunlap and Pinehurst, Fresno Co., 24 May, 1921, *Ottley 1356* (Wellesley, Cornell, and M); Limekiln Creek, Tulare Co., 23 May, 1907, *Jepson 2797* (Calif.); Eschom Creek Redwoods, Kaweah River Valley, 23 July, 1896, *Dudley 1382* (Stanford).

33. M. Grayi Grant[1] Pl. 6, fig. 2.

M. acutidens Hall, Yosemite Fl. 223. 1912, not Greene.

Glabrous or nearly glabrous annuals, simple or branched from the base; stem 8–20 cm. high, slender, somewhat quadrangular, internodes long, usually several times the length of the leaves;

[1] **Mimulus Grayi** Grant, sp. nov., annuus valde glabrus; caulibus tenuibus, 8–20 cm. altis, internodiis elongatis, plus minusve quadrangularibus; foliis paucis, late ovatis, acutis, sessilibus, base latis, 3–5-nervibus; pediculis foliis brevioribus; calyce 6–7 mm. longo, late ovato in fructu, 9–10 mm. longo, 5–6 mm. lato, dentibus ciliatis, brevibus, mature fere truncatis; corolla rosea, 1.2–1.5 cm. longa, lobis inaequalibus, antheris villosis, subglobosis; stigmae laciniis inaequalibus; capsula stipitata.—Collected at Mariposa, May, 1882, *Congdon* (Gray Herb., TYPE).

leaves few, broadly ovate, .7–1.8 cm. long, .5–1.2 cm. wide, thin, acute, denticulate, sessile by a broad base, 3–5-nerved, rarely puberulent; inflorescence racemose, often flowering from near the base; pedicels slender, shorter than the leaves, spreading; calyx puberulent, 6–7 mm. long, broadly oval in fruit, 9–10 mm. long, 5–6 mm. wide, chartaceous, strongly plicate, teeth equal, ciliate, very short, broad, tapering abruptly to a short point, giving a truncate appearance to the mature calyx; corolla slightly bilabiate, 1.3–1.5 cm. long, rose-red, tube exserted, throat expanded, pink with a yellow patch lined with rose-red, two yellow, hairy ridges below the lower lip, lobes short, emarginate, more or less hirsute at the base; stamens included, white, filaments glabrous, anthers subglobose, villous with soft white hairs; style included or slightly exserted, glabrous, stigma-lips unequal; capsule chartaceous, oblong, obtuse, almost truncate at the apex, stipitate, placentae separating nearly one-fourth the entire length; seeds oval, favose-areolate.

Distribution: in the Sierra Nevada Mts. from Yosemite Valley to Tulare Co., California.

Specimens examined:

California: Alder Creek Trail, Yosemite Park, 5500 ft. alt., 1 July, 1911, *Jepson 4321* (Cornell, M, and Calif.); Raymond to Yosemite, 11 June, 1891, *Fritchey 3* (M); Snow Creek, Yosemite Park, 10 July, 1883, *Congdon* (G); Mariposa, May, 1882, *Congdon* (G, TYPE); Darrah, Mariposa Co., 3 July, 1892, *Congdon* (Stanford); Mariposa, 16 May and 17 June, 1892, *Congdon* (Stanford); near Sugar Pine Mill, Madera Co., 12 July, 1901, *Dudley* (Stanford); Coffee Pot Pasture near spring in black soil, vicinity of Homer's Nose, Sequoia Nat. Forest, 9000 ft. alt., 12 July, 1897, *Dudley 1799* (Stanford); Cedar Creek, Sequoia Park, 4000 ft. alt., 20 June, 1900, *Jepson 591* (Calif.); near Cedar Creek, Giant Forest, Tulare Co., 26 July, 1905, *K. Brandegee* (R. Mt. and Pomona); in dry, shady places, Cedar Creek, 4 July, 1902, *G. B. Grant 2345* (Stanford); California, without date, *Bridges 199* (N. Y.).

34. M. inconspicuus Gray in Pac. Rail. Rept. **4**: 120. 1857; Proc. Am. Acad. **7**: 380. 1867; *ibid.* **11**: 99. 1876; Bot. Calif. **1**:

568. 1876, in part; Syn. Fl. N. Am. 2[1]: 278. 1878, ed. 2, and Suppl. 449. 1886, in part; Greene in Bull. Calif. Acad. Sci. **1**: 116. 1885, in part.

Stem glabrous, 5–16 cm. high, somewhat quadrangular with winged angles simple or freely branched from the base; leaves oval or mostly ovate, .8–2 cm. long, .6–1.2 mm. wide, all but the lowest sessile by a broad base, entire or sparingly denticulate, indistinctly 1–3-nerved; pedicels generally erect, slender, longer or shorter than the leaves; calyx 5–6 mm. long, glabrous or minutely puberulent, narrowly campanulate, becoming oval and chartaceous in fruit, 6–7 mm. long, 3 mm. wide, teeth slightly unequal, short, broad, mucronate, giving the mature calyx a somewhat truncate appearance, ciliate; corolla somewhat bilabiate, .8–1 cm. long, rose-pink to pale pink with a yellow streak bordered with rose-pink below the lower lip, tube included, throat funnelform, lobes deeply emarginate, erect, or the lower lip somewhat spreading; stamens included, white, anthers villous with scattered long white hairs; style slightly exserted, stigma-lips unequal, infundibuliform; capsule included, oval, acute at both ends, stipitate, placentae separating at the apex; seeds oval, apiculate at one end.

Distribution: in moist or shaded places in the central and southern Sierra Nevada Mts., and in southern California.

Specimens examined:

California: Grass Valley, Amador Co., 2500 ft. alt., 2 May, 1895, *Hansen 1126* (U. S.); Agricultural Station, Amador Co., 2000 ft. alt., May, 1893, *Hansen 1290* (M and Stanford); Italian Bar, South Fork Stanislaus River, Tuolumne Co., 5 June, 1915, *Jepson 6371* (Calif.); Columbia, Tuolumne Co., 2200 ft. alt., 1 June, 1915, *Jepson 6341* (Cornell, M, and Calif.); Geological Survey of California, 1866, *Rattan 217* (G and U. S.); damp hillsides, Los Angeles, 14 May, 1854, *Bigelow* (G, TYPE, N. Y., and Phil.).

This is the most common species in a closely related group of plants consisting of *M. inconspicuus, acutidens, latidens,* and *Grayi.* Dr. Gray considered them to be conspecific, but later he gave varietal status to *acutidens* and *latidens.* The original material of *M. Grayi* was designated by Dr. Gray under the unpublished varietal name of "truncatus." They all have leaves closely sessile by a broad, 3–5-nerved base, strongly plicate, inflated mature calyces with short broad teeth, subglobose villous anthers, and stipitate capsules.

35. M. nepalensis Benth. in Wall. Cat. no. 3917. 1828; Scroph. Ind. 29. 1835; DC. Prodr. **10**: 373. 1846; G. Don, Hist. Dichlam. Pl. **4**: 554. 1838.

M. assamicus Griff. in Madr. Jour. Sci. **4**: 375. 1836; Notulae **4**: 99. 1854; Linnaea **12**: litt. 199. 1838; Walp. Rep. **3**: 277. 1844–45.

M. tenellus Bunge, Pl. Enum. China, 49. 1831; Benth. DC. Prodr. **10**: 373. 1846; Walp. Rep. **3**: 277. 1844–45.

M. formosana Hayata in Ic. Pl. Formos. **9**: 79. 1920.

A nearly glabrous perennial; stems quadrangular, the angles winged, slender, weak, often diffusely branched, rooting from the nodes; leaves ovate or ovate-oblong, 1.5–4 cm. long, .5–2 cm. broad, acute, saliently dentate, base cuneate or tapering gradually to a short petiole, pinnately veined; pedicels slender, about as long as the leaves, occasionally pubescent; calyx cylindrical, 7–10 mm. long, inflated in fruit and 1.1–1.4 cm. long, 3–7 mm. broad, usually somewhat constricted at the throat, teeth ciliate, nearly equal, truncate or short and broad with slender abruptly pointed tips, occasionally pubescent along the ribs, ribs sometimes slightly winged, throat oblique in some flowering specimens; corolla .8–2 cm. long, yellow, funnelform, little exceeding the calyx, tube exserted, throat ampliate, densely bearded along the lower side, often dotted with red, lobes short, rounded, erect; stamens and style glabrous, included, stigma-lips equal, fimbriate; capsule oblong, placentae adherent to the apex; seeds oval, minutely papillate and occasionally with a few scattered hairs.

Distribution: wet places in Japan, China, and India.

Specimens examined:

Japan: Sapporo, 10 July, 1903, *Arimoto* (G); Yezo, Sapporo, 27 Aug., 1902, *Arimoto* (G); Sapporo, 25 Aug., 1887, *Tokubuchi* (Phil.); Hakone, May, 1886, *Tokio Education Museum* 343 (U. S.); Aidzu, 7 Aug., 1879, *Matsumura* (U. S.).

China: Meng-tsze, Yunnan, without date, *Henry 10450* (U. S.); W. Hupeh, June, 1900, *Wilson 1302* (U. S.); Hupeh, 1885–1888, *Henry 5897* (U. S.); Hupeh, 1885–1888, *Henry 7445* (G).
Manchuria: Valley J-cze-sun-che, District Onioso, Province Kirinensis, 7 Aug., 1896, *Komarov* (G).
India: Himalayas, without other data (Phil.).

The inflated calyx in mature specimens and the small corolla of this species indicate relationship to *M. inconspicuus*, a species confined to California. From this, it differs in having shorter calyx-teeth, a yellow corolla with entire lobes, and glabrous anthers.

35a. Var. **japonica** Miq. ex Maxim. in Bull. Acad. St. Petersburg **20**: 436. 1875.

M. nepalensis forma *japonica* Miq. Prol. 48. 1866–67.

Leaves mostly smaller than in the species, 1.5–2.5 cm. long, .8–1.6 cm. wide; fruiting pedicels longer than the leaves; calyx-tube cylindrical, not broadly inflated, teeth subequal, the two upper somewhat larger than the others; corolla 1.5–2 cm. long.

Distribution: wet places in Japan and India.

Specimens examined:

Japan: Nanokawa, Tosa, July, 1892, *Mizo-hoduki* (U. S.).
India: Pungbee, Sikkim, 500 ft. alt., 28 June, 1870, *Clarke 12114* (U. S.); Sikkim, 7000 ft. alt., May, 1877, *Lister* (U. S.); Sikkim, 4000–10000 ft. alt., 1848–49, *Hooker* (G).

Differs from the species mainly in size and in the length of the pedicels, these being longer than the leaves.

35b. Var. **procerus** Grant[1] Pl. 3, fig. 2.

Stems simple, erect, 2–3.5 dm. long, not winged; leaves broadly ovate or elliptical, 1.5–3.5 cm. long, 1–2 cm. broad, short-petioled, coarsely toothed; fruiting calyx broadly campanulate, 1.3–1.4 cm. long, ribs pubescent, subequal, the upper tooth sometimes longer than the others; corolla 2.5–3 cm. long, throat broadly funnelform, spotted with red; capsule not seen.

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[1] **Mimulus nepalensis Benth. var. procerus Grant, var. nov., caules simplices, erecti, 2–3.5 dm. longi, non alati; foliis late ovatis, 1.5–3.5 cm. longis, 1–2 cm. latis, petiolis brevibus; corolla 2.5–3 cm. longa.—Collected in Sikkim Himalaya, India, 1 Aug., 1892, *G. A. Gammie* (U. S. Nat. Herb. no. 262003, TYPE).**

A larger plant with erect, unbranched stems and larger flowers, merging into *M. nepalensis* through such specimens as *Clarke 12114* from Sikkim. It closely resembles *M. dentatus*, a Pacific Coast species, differing from it mainly in having a smaller and less ampliate corolla which is not constricted at the base of the throat.

Distribution: in wet places in Sikkim, India.

Specimens examined:

India: Sikkim Himalaya, 1 Aug., 1892, *Gammie* (U. S., TYPE); Sikkim, 4000–10000 ft. alt., 1848–49, *Hooker* (G).

36. M. Bodinieri Vaniot in Bull. Acad. Geog. Bot. **15:** 86. 1905.

Low, glabrous, creeping perennials, freely rooting from the nodes; stems prostrate or procumbent, 1–2 dm. long, simple or with short branches, quadrangular, the angles more or less winged; leaves broadly ovate, 1–3 cm. long, .5–1.5 cm. wide, acute, mucronate, minutely and sparsely denticulate, pinnately veined, sessile by a broad, clasping subcordate base, rarely short-petioled; flowers few, axillary, pedicels weak, longer than the leaves; calyx campanulate, 6–10 mm. long, ciliate, throat slightly oblique, teeth short, broadly triangular, mucronate; corolla yellow, 1.3–1.5 cm. long, throat exserted, lobes nearly equal, slightly spreading; style included, glabrous, stigma-lips equal; capsule obovate, obtuse; seeds subglobose.

Distribution: in standing water, southern China.

Specimens examined:

China: Yunnan, near Likiang, about 8500 ft. alt., 8 July, 1914, *Schneider 1771* (U. S.); in the region of Likiang, near Pegu-Ngu-lch-keh, about 8700 ft. alt., 18 July, 1914, *Schneider 1863* (U. S.).

37. M. sessilifolius Maxim. in Bull. Acad. Sci. St. Petersburg **20:** 436. 1875; Gray, Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 447. 1886.

A glabrous or almost glabrous perennial, stems erect or flaccid, somewhat quadrangular; leaves broadly ovate, 2–7 cm. long, 1.5–3 cm. wide, closely sessile, 5–7-nerved from the base, lower acute, upper smaller and obtuse or rounded above, all saliently toothed, the upper with large teeth, mostly puberulent at the nodes; pedicels slender, shorter than the leaves; calyx campanulate to funnelform, 1–1.2 cm. long, teeth deltoid-acute, 2–3 mm. long, subequal, ciliate; corolla bilabiate, 3 cm. long, funnelform, yellow, throat ampliate, exserted, about twice as long as the calyx, lobes subequal, rounded, 8–10 mm. long; stamens and style included, glabrous, filaments thin, flattened; capsule oblong, dehiscent to the base, placentae adherent; seeds broadly oval, longitudinally wrinkled.

Distribution: wet places in Japan.

Specimens examined:

Japan: Togakushi-san, Province Shinano, 12 June, 1894, without name of collector (U. S.); Suttsu, Prov. Oshima, 19 July, 1888, *Tokubuchi* (Phil.); Sapporo, 22 June, 1884, *Tokubuchi* (G); Mori, 4 June, 1885, *Père Fourie 327* (M).

This species is closely related to *M. dentatus* and *M. nepalensis* but differs from them in its closely sessile and 5–7-nerved leaves.

38. **M. dentatus** Nutt. ex Benth. in DC. Prodr. **10**: 372. 1846; Gray in Bot. Calif. **1**: 567. 1876; Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 447. . 1886; Greene in Bull. Calif. Acad. Sci. **1**: 109. 1885; Howell, Fl. Northwest Am. 519. 1901; Piper, Contr. U. S. Nat. Herb. **11**: 509. 1906.

Perennial from running rootstocks and with pubescent stolons above ground, rooting at the nodes; stem simple, erect, 1.5–3.5 dm. high, sparsely villous; leaves broadly ovate, 2–7 cm. long, 1.2–3.5 mm. wide, acute, tapering to a short petiole, sparingly pubescent, coarsely and saliently dentate on the upper half, often tinged with red; pedicels slender, pubescent, shorter than the leaves; calyx campanulate, 1.1–1.5 cm. long, sparsely villous along the acutely angled ribs, teeth triangular-acuminate, 4–6 mm. long, ciliate, subequal, throat oblique; corolla 3.5–4.5 cm. long, golden-yellow, tube short, included, constricted at the apex, throat almost as broad as long, ventricose, spotted with brown on the lower side, lobes rounded, 6–12 mm. long, usually erect, sometimes emarginate, sinuses broad; stamens included, filaments glabrous, anthers villous; style and stigma glabrous, included, stigma-lips rounded, equal, fimbriate; capsule oblong, included, placentae adherent; seeds oval, favose-pitted.

Distribution: in woods and along streams from Washington to northern California.

Specimens examined:

Washington: Columbia River, *Nuttall* (G, TYPE); Montesano, Chehalis Co., 200 ft. alt., 10 June, 1898, *Heller & Heller 3926* (Phil. and M); along streams, Montesano, May, 1917, *J. M. Grant* (M); North Branch, Pacific Co., 16 Aug., 1903, *Sheldon S12959* (Stanford); wet rocks, wet places in dense forests at Altoona on the Columbia River, 20 July, 1909, *Suksdorf 6673* (G).

Oregon: near Astoria, 12 May, 1892, *Howell* (M); Falls City, 8 May, 1915, *J. C. Nelson 120* (Stanford); Brookings, May, 1915, *J. H. Thompson 178* (Stanford); Tillamook, 10 Sept., 1894, *Lloyd* (N. Y.); Toledo, 7 Aug., 1909, *Rusby* (N. Y.); Coast Mts., July, 1882, *Howell* (Phil.); damp bank, 3 miles above mouth of Chetco River, Curry Co., 12 July, 1919, *Peck 8810* (M); Corvallis environs, May, 1922, *Epling 5549* (Epling); Yaquina, 28 July, 1922, *Epling 5554* (Epling).

California: Humboldt Bay, 1000 ft. alt., May, 1901, *Chandler 1199* (N. Y., M, Calif., and Stanford); Humboldt Co., 1882, *Rattan* (G and M); in moist places, Freshwater Creek, Humboldt Co., very common in the forests of Humboldt and Del Norte Co's., June, 1882, *Rattan 25* (G); Coast Mts., north of San Francisco Bay, June, 1882, *Rattan* (M); Humboldt Co., 1911, *H. H. Smith 3791* (M); wet ground under redwoods, Eureka, 31 May, 1896, *Blasdale* (R. Mt.); Humboldt Co., 1879, *Rattan* (Stanford); Humboldt Bay, June, 1882, *Rattan* (Calif. and Stanford); near Crescent City, without date, *Rattan* (Stanford); Klamath River, Del Norte Region, June, 1899, *Dudley* (Stanford); common in shaded moist ground, vicinity of Eureka, 30 May, 1900, *Tracy 833* (Calif.).

39. M. Bridgesii (Benth.) Clos in C. Gay, Hist. Chile **5**: 141. 1849; Walp. Ann. **3**: 193. 1852–53; Reiche, Fl. Chile **6**^{1}: 63. 1911.

M. parviflorus β *Bridgesii* Benth. in DC. Prodr. **10**: 371. 1846.

Glabrous perennials, freely rooting at the nodes; stems ascending or erect, 1–3 dm. long; leaves few, ovate or oval, 1.2–3.5 cm.

long, .5–2 cm. broad, obtuse, dentate or erose, 3–5-nerved from the base, upper leaves sessile by a broad clasping base, the lower sessile or short-petioled; pedicels slender, elongated, 2–4 times the length of the leaves; calyx campanulate, 7–8 mm. long, tinged with red, sometimes minutely puberulent, much inflated and oval in fruit, the top appearing as though truncate, teeth broadly triangular-acute, 1 mm. long, nearly equal, the orifice scarcely oblique; corolla 1.5–2.2 cm. long, broadly funnelform, the lower lip and open throat spotted with red, lobes unequal, little spreading; style glabrous, stigma-lips oblong, nearly equal; capsule included, elliptical, acute, short-stipitate, placentae separating at the apex; seeds smooth, oval, less than twice as long as broad, not apiculate.

Distribution: in wet places from central to southern Chile.

Specimens examined:

Chile: Colchagua, 1862, *Bridges* or *Cuming* ? (U. S.); Cauquenes, without date, *Reid* (G); stagnant ditch, Valdivia, 12 Nov., 1904, *Buchtien 109* (Calif.); without further data, *Dr. Styles* (Phil.).

Clos has described two varieties: (1) *stolonifera*, tall plants with remote leaves, either short or long-petioled, acute and erose-dentate; (2) *integrifolia*, small plants, leaves close together, sessile, subconnate, nearly entire. Material of these varieties has not been seen by the writer. *M. longipes* Ph. in Linnaea **29**: 28. 1857–58, is probably a synonym of the variety *integrifolia*.

40. M. Pulsiferae Gray in Proc. Am. Acad. **11**: 98. 1876; Bot. Calif. **1**: 568. 1876; Syn. Fl. N. Am. **2**^{1}: 277. 1878, ed. 2, and Suppl. 450. 1886; Greene in Bull. Calif. Acad. Sci. **1**: 115. 1885; Howell, Fl. Northwest Am. 521. 1901; Piper, Contr. U. S. Nat. Herb. **11**: 510. 1906. Pl. 10, fig. 10.

Stems slender, 5–15 cm. high, glandular-puberulent, simple or more often loosely branched from the base; leaves short-petioled, narrowly oblong or occasionally spatulate, .8–2.2 cm. long, 4–10 mm. broad, acute, base cuneate or acute, entire or irregularly denticulate, puberulent; pedicels filiform, shorter than the corolla, becoming elongated and somewhat curved and spreading in fruit, usually much longer than the leaves; calyx narrowly tubular, 5–7 mm. long, accrescent, 9 mm. long in fruit, rarely inflated, teeth equal or nearly so, triangular-acute, 1 mm. long, sometimes becoming constricted at the throat and slightly connivent, margins sparingly hispid; corolla 7–11 mm. long, yellow, tube exserted, funnelform, lobes short, erect, unequal, truncate, entire or notched, sometimes tinged with pink or with a single large red spot below the middle lobe of the lower lip; stamens glabrous, filaments flattened, included; style glabrous, included; stigma-lips oblong, nearly equal; capsule slightly oblong, often as long as the calyx, placentae not separating; seeds oval, smooth.

Distribution: Washington to northern California.

Specimens examined:

Washington: damp low grounds, Falcon Valley, June, 1885, *Suksdorf* (M and Stanford); damp low grounds, Falcon Valley, 10 June–30 July, 1885, *Suksdorf 486* (G); damp low bare grounds near Trout Lake, Klickitat Co., 26 July, 1886, *Suksdorf* (G).

Oregon: bar of Columbia River, 1884, *Barrett* (G); margin of pond, 1 mile east of Waldo, Josephine Co., 22 June, 1918, *Peck 7935* (G); Grant's Pass, May, 1884, *Howell 236* (G); Big Meadow, Des Chutes River, about 4500 ft. alt., 23 July, 1894, *Leiberg 491* (G).

California: Metcalf's Ranch, base of Mt. Eddy, Siskiyou Co., June, 1920, *Heller 13391* (M); Sierra Valley, *Bolander & Kellogg* (G); near Shasta Springs, Siskiyou Co., 5 June, 1905, *Heller 7961* (M); Sisson, 24 July–10 Aug., 1894, *Jepson 55m* (Calif.); Castle Crag, near Mt. Shasta, 23 June, 1893, *Dudley* (Stanford); McCloud River, 6 miles below Bartlett, June–Aug., 1893, *M. S. Baker* (M and Calif.); wet ground near Hyampam, Trinity Co., June, 1883, *Rattan* (Stanford); base of Mt. Eddy, Siskiyou Co., 20 June, 1919, *Heller 13261* (Cornell and M); Bear Valley, Nevada Co., 21 July, 1898, *Jepson 57m* (Calif.); near Clear Creek, Butte Co., 175 ft. alt., 1–15 May, 1897, *Brown 322* (M, R. Mt., and Stanford); near Cohasset, Butte Co., 12 April, 1915, *Heller 11805* (Cornell, M, and Stanford); Indian Valley, 1873, *Ames 21* (G, TYPE); without locality, *Bridges 200* (U. S.); Haile Place, Mariposa Co., 18 June, 1892, *Congdon C71* (G); La Jota Plateau, Howell Mt., 8 May, 1893, *Jepson 58m* (Calif.).

The petioled leaves, cylindrical calyx, and longer corolla separate this species from *M. latidens*, while the smaller corolla and glabrous style distinguish it from *M. washingtonensis* to which it is most nearly related.

41. **M. washingtonensis** Gdgr. in Bull. Soc. Bot. Fr. IV. **19**: 218. 1919.

M. pedunculаris Gray, Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 450. 1886, not Dougl.; Greene in Bull. Calif. Acad. Sci. **1**: 281. 1885; Howell, Fl. Northwest Am. 521. 1901; Piper, Fl. Southeast Wash. and Adj. Idaho, 228. 1914; Henry, Fl. Brit. Columbia, 269. 1915; Rydb. Fl. Rocky Mountains, 779. 1917.

A small pubescent or glandular-pubescent annual; stems somewhat quadrangular, 4–18 cm. high, simple or usually loosely branched from the base; leaves triangular-ovate or lanceolate, .9–1.5 cm. long, 2–7 mm. broad, rather thick, acute, denticulate, base more or less cuneate, often reddish-purple on the lower surface and with scattered white hairs, 1–3-veined from the base; petioles mostly shorter than the blades; pedicels filiform, much elongated, spreading or divaricate in fruit, slightly thickened at the base; calyx 5–7 mm. long, prismatic, minutely puberulent, distinctly angled, not inflated when mature, ribs reddish, teeth equal, short, broad, mucronate, 1 mm. long, ciliate; corolla bilabiate, 1–2 cm. long, yellow, tube slender, funnelform, much exserted, palate densely hairy, partly closing the throat, lobes rounded, entire, the lower lip spreading and almost twice as long as the erect upper one; stamens included, glabrous; style pubescent, not much longer than the upper pair of stamens, stigma-lips unequal, broadly rounded, laciniate; capsule not much over half as long as the calyx, oblong, placentae not separating; seeds oblong, smooth.

Distribution: moist sandy places in Washington and Oregon.

Specimens examined:

Washington: moist sandy banks of the Columbia River, W. Klickitat Co., Sept., 1883, *Suksdorf 204* (G); low sandy banks of the Columbia River, Klickitat Co., 25 Sept., 1881, *Suksdorf 51* (G); low sandy banks of the Columbia, W. Klickitat Co., Oct., Nov., 1885, *Suksdorf 560* (G, M, and Stanford, *type collection*); on banks of the Columbia River, 1884, *Barrett* (G).

Oregon: John Day Valley, 18 May, 1885, *Howell 519* (G and Phil.).

This species was confused by Dr. Gray, Dr. Greene, and a number of later botanists with *M. peduncularis* Benth. Material for comparison was sent to the Royal Botanic Gardens, Kew, England, and a sketch of the type specimen and a scrap from it were sent from there to the Missouri Botanical Garden. These show, without doubt, that Bentham's *M. peduncularis* is a small-sized plant of *M. floribundus*, and what Dr. Gray, Dr. Greene and others took for *M. peduncularis* is a plant that was not described until 1909, when Gandgoger published *M. washingtonensis* as a new species.

42. M. ampliatus Grant[1]

Stems erect or ascending, 7–15 cm. high, viscid-puberulent; leaves broadly ovate, acute, 1–2.5 cm. long, .5–1.2 cm. wide, dentate, base cuneate, petioles slender and mostly longer than the blade; pedicels filiform, somewhat spreading, longer than the leaves; calyx tubular, 5–6 mm. long, the fruiting calyx 6–7 mm. long, 3–4 mm. wide, teeth short, broadly triangular, acute, 1 mm. long, ciliate; corolla bilabiate, funnelform, 1.2–2 cm. long, yellow, tube exserted, throat ventricose, ampliate, lobes short, unequal, the lower lip longer and little spreading; stamens included, glabrous; style barely exserted, glabrous, stigma-lips equal; capsule shorter than the calyx, narrowly ovate, acute, placentae adherent at the apex; seeds longitudinally wrinkled.

Distribution: moist places in southwestern Idaho and eastern Washington.

Specimens examined:

Idaho: Lake Waha, Nez Perces Co., 2500–3000 ft. alt., 27 June, 1896, *Heller & Heller 3330* (M, TYPE, Cornell, U. S., and Stanford); moist places on hillsides, Wessell Place near Lewiston, 19 June, 1894, *Henderson 2676* (G and R. Mt.); Lake Waha,

[1] **Mimulus ampliatus** Grant, sp. nov., caules erecti, viscido-puberulentes, 7–15 cm. longi; foliis late ovatis, dentatis, basi cuneatis, petiolo lamina longiore; calyce cylindrato, dentibus late triangularibus-acutis; corolla flava, 1.2–2.2 cm. longa, fauce ampliata, lobis inaequalibus, brevibus; stylo glabro, laciniis aequalibus.—Collected about Lake Waha, Nez Perces Co., Idaho, 2000–3500 ft. alt., 27 June, 1896, *A. A. & E. Gertrude Heller 3330* (Mo. Bot. Gard. Herb. no. 893244, TYPE).

Crag's Mts., 23 June, 1894, *Henderson 2675* (G); on hills, Lake Waha, Nez Perces Co., 23 June, 1890, *Henderson 2675a* (Cornell).

Washington: along irrigation ditches, Wawawai, May, 1897, *Elmer 752* (M, R. Mt., and Pomona).

43. M. arenarius Grant[1] Pl. 8, fig. 1.

Small glandular-pubescent annuals, somewhat slimy and with soft white hairs; stems 8–15 cm. long, simple or branched; leaves few, mostly elliptical, sometimes ovate, with a rounded base, acute, 1–1.7 cm. long, 3–7 mm. wide, sessile, often reddish on the lower surface, entire or sparingly denticulate, 1–3-nerved from the base, occasionally with short-petioled lower leaves; fruiting pedicels slender, reddish, longer than the leaves, usually divaricate and more or less curved; calyx narrowly campanulate, 5–6 mm. long, slightly larger in fruit, 6–8 mm. long, often dotted with red, teeth subequal, triangular-acute, ciliate; corolla bilabiate, 1.3–1.7 cm. long, yellow, tube exserted, throat funnelform, with a hairy ring at the base of the lobes and two densely hairy ridges more or less dotted with red down the throat, lobes unequal, the middle lobe of the lower lip longer and spreading; stamens glabrous, included, filaments flat; style slightly exserted, flattened, glabrous, stigma-lips broadly rounded, equal; capsule elliptical, longitudinally striate; seeds oval, papillate.

Distribution: moist sandy places in the Transition Zone of the Sierra Nevada Mts., from Mariposa Co. to Fresno Co., California.

Specimens examined:

California: near Wawona, Mariposa Co., 5000 ft. alt., 23 June, 1918, *A. L. Grant 1309* (N. Y., Cornell, M, Calif. Acad., and Calif.); in sandy places, Jackass Meadow, Madera Co., 7000 ft. alt., 25 June, 1918, *A. L. Grant 1336* (Cornell, M, and Calif.);

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[1] **Mimulus arenarius** Grant, sp. nov., annuus pumilus, pubescens, viscoso-villosus; foliis ellipticis, integerrimis vel parce denticulatis; pediculis foliis longioribus, plerumque divaricatis, curvatis; calyce fructifero campanulato, 6–8 mm. longo, dentibus subaequalibus; corollae labiis inaequalibus, 1.3–1.7 cm. longis; stylo exserto, glabro, laciniis aequalibus.—Collected in moist sandy places near Huntington Lake, Fresno Co., 7000 ft. alt., 5 July, 1917, *Adele Lewis Grant 1032* (Gray Herb., Phil. Acad. Nat. Sci. Herb., Cornell Univ. Herb., Mo. Bot. Gard. Herb. no. 849663, TYPE, Rocky Mt. Herb., Univ. Calif. Herb., Stanford Univ Herb., and Pomona Coll. Herb.).

Arnold Meadow, Madera Co., 5000 ft. alt., 27 June, 1918, *A. L. Grant 1344a* (Cornell, M, and Calif.); Raymond, Madera Co., 10 June, 1894, *Burnham* (Cornell); Huntington Lake, Fresno Co., 6 July, 1918, *A. L. Grant 1412* (M and Calif.); Huntington Lake, 20 July, 1917, *A. L. Grant 1119* (M and Stanford); in moist sandy places near the Lake, Huntington Lake, 7000 ft. alt., 5 July, 1917, *A. L. Grant 1032* (G, Phil., Cornell, M, TYPE, R. Mt., Calif., Stanford, and Pomona).

This species is intermediate between *M. floribundus* and *M. Pulsiferae*. It may be separated from the first by its leaves, which are mostly elliptical and either entire or sparingly denticulate, by the length of the corolla, and by the curved and divaricate pedicels. It may be distinguished from *M. Pulsiferae* by the type of the pubescence, the shorter calyx-tube, and the longer style.

44. M. floribundus Dougl. in Lindl. Bot. Reg. *pl. 1125*. 1828; Benth. Scroph. Ind. 29. 1835; DC. Prodr. **10**: 372. 1846; Hook. Fl. Bor. Am. **2**: 99. 1840; Hook. & Arn. Bot. Beechey's Voyage, 378. 1840; Gray in Proc. Am. Acad. **11**: 99. 1876; Bot. Calif. **1**: 569. 1876; Syn. Fl. N. Am. **2**^{1}: 278. 1878, ed. 2, and Suppl. 450. 1886; Wats. Bot. King's Exp. 224. 1871; Greene in Bull. Calif. Acad. Sci. **1**: 117. 1885; Manual Bay Region, 276. 1894; Howell, Fl. Northwest Am. 522. 1901; Jepson, Fl. W. Mid. Calif. 407. 1901, and ed. 2, 379. 1911; Eastwood, Fl. South Fork King's River, Sierra Club Publ. 27: 66. 1902; Abrams, Fl. Los Angeles, 366. 1904, and ed. 2, 336. 1917; Nelson in Coulter & Nelson, Manual Cent. Rocky Mountains, 454. 1909; Hall, Yosemite Fl. 222. 1912; Piper, Fl. Southeast Wash. and Adj. Idaho, 228. 1914; Henry, Fl. Brit. Columbia, 269. 1915; Rydb. Fl. Rocky Mountains, 779. 1917.

M. peduncularis Dougl. in Benth. Scroph. Ind. 29. 1835; G. Don, Hist. Dichlam. Pl. **4**: 554. 1838; Walp. Rep. **3**: 376. 1844–45.

M. serotinus Suksd. Deut. Bot. Monatsschr. **18**: 154. 1900.

M. floribundus β *minor* Hook. Fl. Bor. Am. **2**: 99. 1840.

M. pubescens Benth. in DC. Prodr. **10**: 372. 1846.

M. deltoideus Gdgr. in Bull. Soc. Bot. Fr. **19**: 218. 1919.

A viscid-villous, more or less slimy annual; stems 8–50 cm. long, diffusely branched from the base, somewhat weak, often climbing over moist rocks; leaves scattered, thin, ovate to ovate-lanceolate, 1.5–5 cm. long, .5–3 cm. wide, acute, dentate with short salient teeth, ciliate, base broad, mostly truncate or subcordate, 3–5-nerved, usually shorter than the internodes, petioles longer or shorter than the blade, sometimes slightly winged or occasionally sessile; pedicels filiform, frequently shorter than the leaves and more or less spreading in maturity; calyx plicate-carinate, slightly campanulate, 4–7 mm. long, broadly ovate in fruit and 6–10 mm. long, often spotted or tinged with red, teeth triangular, lanceolate, 1–1.5 mm. long, ciliate, equal; corolla cylindrical to funnelform, .7–1.4 cm. long, yellow, tube slightly exserted, throat short, ampliate, dotted or streaked with red, lobes unequal, mostly erect, short, rounded, the lower lip sometimes slightly spreading; style and stamens glabrous, included, stigma-lips equal, rounded; capsule chartaceous, shorter than the calyx, oblong, placentae completely adherent; seeds oval, longitudinally wrinkled.

Distribution: moist places in the mountains from British Columbia south to Colorado and California.

Specimens examined:

British Columbia: Sprout, 30 June, 1890, *Macoun* (M); grassy places, Elk River, 24 July, 1883, *Dawson* (G).

Wyoming: wet banks, Halleck Cañon, Albany Co., 4 July, 1900, *Nelson 7440* (G, M, R. Mt., and Pomona); moist ledges, Jelm, Albany Co., 8 July, 1907, *Nelson 9076* (R. Mt.); Grand Teton, Jackson's Hole, 6 Aug., 1920, *Payson & Payson 2226* (Cornell and R. Mt.).

Colorado: Black Cañon, Gunnison Watershed, 7075 ft. alt., 20 June, 1901, *C. F. Baker 200* (M, R. Mt., and Pomona); Cimarron, 6900 ft. alt., 6 June, 1901, *C. F. Baker 30* (G, M, and Pomona); Arkansas Cañon, 21 July, 1873, *T. S. Brandegee 815* (M); Colorado, 1872, *Greene 224* (M); Fort Collins, 28 Aug., 1894, *C. F. Baker 554* (Pomona); San Luis Valley, Sept., 1873, *Wolfe 311* (Cornell); pond, Boulder, 5500 ft. alt., 30 June, 1906, *Daniels 247* (M); mountains between Sunshine and Ward, Boulder Co., 8000 ft. alt., Aug., 1902, *Tweedy 5202* (R. Mt.);

Powell's Colorado Exploring Expedition, 1868, *Vasey 396* (M).

Arizona: Verde River, 27 May, 1867, *Smart 203* (G).

Idaho: sandy places, Lemp Gulch, Boise, 22 Aug., 1911, *Clark 289* (R. Mt.); Truckee Valley, 4500 ft. alt., July, 1867, *Watson 794* (G); Salmon, 23 June, 1920, *Payson & Payson 1755* (Cornell and R. Mt.).

Nevada: about Washoe Lake, Washoe Co., 25 June, 1902, *C. F. Baker 1174* (M, R. Mt., and Pomona).

Washington: on the Columbia, 1826, *Douglas* (M, sketch of the type of *M. peduncularis* Benth. sent from Kew Herb.); damp sandy bank of the Columbia River, Bingen, Sept.–Dec., 1904, *Suksdorf* (R. Mt.); damp, sandy banks of the Columbia River, Sept.–Dec., 1892, *Suksdorf 2185* (M and Stanford); damp cliffs, Almata, 28 June, 1894, *Piper 1867* (R. Mt. and Pomona); Sprague, 30 May, 1892, *Henderson* (M); Whitman Co., 18 July, 1892, *Henderson* (M); springy patches or along irrigation ditches, Wawawai, May, 1897, *Elmer 754* (M); Yakima Region, Northern Transcontinental Survey, 1882, *T. S. Brandegee 206a* (M); Spokane Falls, 24 Sept., 1880, *Watson 309* (G); moist ground, Spokane, 18 Aug., 1892, *Sandberg, MacDougal & Heller 926* (G); moist sandy bank of the Columbia, W. Klickitat Co., Sept., 1883, *Suksdorf 205* (G); on limestone rocks on dry sandy soils in the interior of the Columbia, 1826, *Douglas* (G, probably part of the *type collection*).

Oregon: Currant Creek, 11 May, 1885, *Howell 517* (G); moist situations, North Pine Creek, near Snake River, 13 July, 1899, *Cusick 2237* (Cornell and M); Oregon, 1871, *E. Hall 377* (G and M).

California: near Kneeland, Humboldt Co., June, 1882, *Rattan* (Stanford); moist places in a forest near Little Lake, Mendocino Co., June, 1882, *Rattan* (G); swamp near Willett's, Mendocino Co., June, 1882, *Rattan* (Stanford); Squaw Creek Ranger Station, Shasta Co., June, 1916, *Drew* (Stanford); Stillwater, Shasta Co., 4 July, 1898, *M. S. Baker 280* (Pomona); Eldorado Co., 1886, *Rattan* (Stanford); Sulphur Creek, Colusa Co., 26 June, 1877, *Rattan* (Stanford); Sierra Co., 1874, *Lemmon* (G); Sonoma Creek bed, 9 May, 1885, *Rattan* (Stanford); Swanton, Santa Cruz Co., spring, 1912, *Rich* (Stanford); Boulder Creek, Santa Cruz Co., 3 Aug., 1907, *Walker 808* (Pomona); Santa Cruz, 24 June, 1903, *C. H. Thompson* (M); Carmel River near Pacific Grove, 5 July, 1907, *Patterson & Wiltz* (Stanford); Pine Mt. opposite St. Simeon Bay, San Luis Obispo Co., 22 July, 1876, *Edw. Palmer 323* (M); growing beside a water trough and climbing over the wet rocks, Priest's Grade, Tuolumne Co., 9 July, 1916, *A. L. Grant 823* (M, Ore., and Calif. Acad.); in meadows, Yosemite, 17 Aug., 1872, *Redfield 6107* (M); near Stoneman Orchard, Yosemite Valley, 4000–4500 ft. alt., 19 June, 1911, *Abrams 4380* (Stanford); meadow near Sentinel Hotel, Yosemite Valley, 4000–4500 ft. alt., 6 July, 1911, *Abrams 4627* (Stanford); Arnold Meadow, Madera Co., 5000 ft. alt., 27 June, 1918, *A. L. Grant 1344* (G, N. Y., M, Calif., and Pomona); Huntington Lake, Fresno Co., 7000 ft. alt., 26 July, 1917, *A. L. Grant 1469* (M); near Milo, Tulare Co., 6 April, 1900, *Dudley* (Stanford); wet rocks, Middle Tule River, 4000–5000 ft. alt., Apr.–Sept., 1897, *Purpus 5602* (M); Three Rivers, Tulare Co., 9 July, 1904, *Culbertson*, distributed as *C. F. Baker 4214* (M); Kern River Cañon, near Bakersfield, 7 Oct., 1910, *McGregor 32* (Stanford); Avalon, Santa Catalina Island, April, 1896, *Trask* (M); in wet arroyos, San Clemente Island, June, 1903, *Trask* (U. S.); Upper Millard's Cañon, San Gabriel Mts., 29 July, 1917, *F. Grinnell, Jr.* (Stanford); Sturtevant's Camp, Mt. Wilson, 25 July, 1901, *G. B. Grant 4452* (Stanford); weakly erect in shady places near water, Millard Canyon, Pasadena, 17 June, 1904, *G. B. Grant 790* (R. Mt. and Stanford); West Fork San Gabriel River, Los Angeles Co., 9 July, 1901, *Abrams 1873* (Stanford); along streams, near Laguna, July, 1916, *Crawford* (Pomona); moist, sandy creek-bank near Los Angeles, 25 June, 1915, *Macbride & Payson 765* (R. Mt.); sandy flats along creeks, Santa Monica Range, June, 1890, *Hasse* (M); along streams in Palmer's Cañon, Claremont, 14 Aug., 1915, *Crawford* (M and Pomona); Icehouse Cañon, San Antonio Mts., 5200 ft. alt., 16 June, 1918, *I. M. Johnston* (Pomona); San Antonio Cañon near Claremont, 2 Aug., 1903, *C. F. Baker 3448* (M and Pomona); Little Santa Anita Canyon, Los Angeles Co., 1 July, 1902, *Abrams 2611* (M and Stanford); Red Hill near Upland, 1300 ft. alt., 4 July, 1918, *I. M. Johnston*

(Pomona); wet sand in wash, Upland, 4 May, 1917, *Parish 11172* (M); river banks, Victorville, 26 June, 1915, *Parish 10606* (Stanford); Little Bear Valley, San Bernardino Mts., Aug., 1884, *Parish 447* (Stanford); Arrowhead Hot Springs, 23 May, 1906, *G. B. Grant 6658* (Stanford); Icehouse Cañon, San Antonio Mts., 7000 ft. alt., 16 June, 1918, *Parish 11961* (M); shady places in the mts., San Bernardino Co., May, 1888, *Parish* (M); Strawberry Valley, Riverside Co., 8 Aug., 1901, *G. B. Grant 4488* (Stanford); along water courses, in the vicinity of Strawberry Valley, 5200 ft. alt., June, 1901, *H. M. Hall 2202* (M and Stanford); river bottoms by stream in very damp soil, San Jacinto River Cañon, 30 May, 1917, *Jenkins & Street* (Pomona); Cuyamaca Mts., July, 1889, *Orcutt* (M); Pine Valley, San Diego Co., 2 Sept., 1882, *Orcutt 591* (M); Jamul Valley, San Diego Co., 1500 ft. alt., June, 1895, *Stokes* (Stanford).

Mexico:

Sinaloa: gravel beds along river in vicinity of San Blas, 24 March, 1910, *Rose, Standley & Russell 13395* (U. S.).

Chihuahua: Hacienda, San Jose, 2000 ft. alt., Aug., 1885, *Edw. Palmer 62* (Phil.).

44a. Var. geniculatus (Greene) Grant, comb. nov.

M. geniculatus Greene in Bull. Calif. Acad. Sci. **1**: 280. 1885; Hall, Yosemite Fl. 222. 1912.

Branches spreading, typically strongly geniculate at the thickened nodes, plant sparingly villous.

Distribution: in the mountains of Idaho and California.

Specimens examined:

Idaho: dry, stony cliffs, Three Creeks, 1 July, 1912, *Nelson & Macbride 2235* (R. Mt.).

California: Truckee, Sept., 1888, *Brandegee* (G); Truckee, Sept., 1888, *Curran* (Calif.); Lewis, Mariposa Co., 26 April, 1895, *Congdon* (Stanford); Fresno Co., Oct., 1890, *Peckinpah* (U. S.); Toll House, Fresno Co., 2050 ft. alt., 13 June, 1900, *Hall & Chandler 5* (Stanford); in rock crevices of Dry Butte, Tehachapi, 14 June, 1907, *Hasse & Davidson*, (G); Tehachapi, 1884, *Curran* (M and Stanford, *type collection*); in moist sandy places along streams, San Bernardino Forest Reserve, 28 Dec., 1903, *Mell & Knopf* (M); Caliente, 11 May, 1891, *T. S. Brandegee* (Calif.).

Numerous specimens of *M. floribundus* occur which show slight geniculations at some of the nodes and connect the variety with the species.

44b. Var. **membranaceus** (A. Nels.) Grant, comb. nov.

M. membranaceus A. Nels. in Bot. Gaz. **34**: 30. 1902; Rydb. Fl. Rocky Mountains, 779. 1917.

Stems slender, more or less procumbent, sparsely villous, geniculate, sometimes winged on the upper part; leaves thin, membranaceous, often almost glabrous, the petioles frequently winged.

Distribution: in damp, shaded places in Rocky Mountains and in California.

Specimens examined:

Montana: McDonald Lake, 7 Aug., 1893, *Williams 343* (R. Mt.).

Wyoming: under moist cliffs, Crow Creek, Albany Co., July, 1903, *Nelson 8951* (G, M, and R. Mt.); Cummins, 28 July, 1895, *Nelson 1515* (Cornell, M, and R. Mt.); headwaters of Clear Creek and Crazy Woman River, Big Horn Mts., 7000–9000 ft. alt., 20 July–15 Aug., *Tweedy 3423* (R. Mt.); in damp, shaded woods, Centennial, Albany Co., 27 July, 1900, *Nelson 7729* (R. Mt.); Centennial Hills, 17 Aug., 1895, *Nelson 1683* (G, Cornell, M, and R. Mt., TYPE); Centennial, Albany Co., 7 Aug., 1902, *Nelson 8828* (G, Cornell, M, R. Mt., and Pomona).

Colorado: Flagstaff Mt., near Boulder, 19 July, 1906, *Robbins 2138* (R. Mt.); in wet places, mountain sides about Empire, 6 Aug., 1892, *Patterson 251* (M); wet rocks, Georgetown, 17 Aug., 1874, *Engelmann* (M).

Idaho: shaded river banks, St. Anthony, 5 July, 1901, *Merrill & Wilcox 827* (R. Mt.).

Utah: Bullion Cañon, in and near the Gorge, 27 July, 1905, *Rydberg & Carlton 7269* (R. Mt.).

California: hills about 3 miles above Pollasky, 11 April, 1906, *Heller 8142* (Phil., M, and Stanford); Millard Canyon, near

Pasadena, 16 June, 1904, *G. B. Grant 790a* (R. Mt. and Stanford); San Bernardino Valley, 1000 ft. alt., 28 June, 1905, *Parish 5405* (R. Mt.).

This is undoubtedly a shade form of the species and is to be distinguished by its thin leaves, which are sparsely villous, and by its usually winged petioles. All gradations are found between this and the species.

44c. Var. subulatus Grant, var. nov.[1]

Fruiting calyx 8–9 mm. long, constricted at the throat, teeth deltoid-subulate, 2–3 mm. long, and strongly spreading; corolla 1.5–2 cm. long, broadly funnelform.

Distribution: in damp sandy soil of the central Sierra Nevada Mountains, California.

Specimens examined:

California: Yankee Hill, Columbia, 8 June, 1915, *Jepson 6401* (Calif.); growing in moist places along the roadside, between Hog Ranch and Hetch-Hetchy Valley, 4200 ft. alt., 16 June, 1917, *A. L. Grant 970* (M, TYPE, G, U. S., Calif.); near Hetch-Hetchy Valley, 10 June, 1916, *A. L. Grant 805* (M and Calif.); McGill's Meadow to Lake Eleanor, Tuolumne Co., 12 July, 1894, *Burnham* (Cornell); above Mormon Bar, Mariposa Co., 26 July, 1903, *Congdon* (M); Coulterville Trail, Mariposa Co., 29–30 July, 1895, *Congdon* (Stanford); Hetch-Hetchy, 3700 ft. alt., 29 July, 1909, *Jepson 3442* (Calif.); Hog Ranch, Yosemite Park, 5000 ft. alt., 3 Aug., 1911, *Jepson 4627* (Calif.); Coulterville, 14 July, 1896, *Jepson 38m* (Calif.); Little Yosemite, 6300 ft. alt., 5 July, 1909, *Jepson 3143* (Calif.).

45. M. jungermannioides Suksd. Deut. Bot. Monatsschr. 18: 154. 1900; Piper, Contr. U. S. Nat. Herb. **11**: 511. 1906.

A low, nearly prostrate perennial, propagating itself by runners which produce small terminal buds in the fall; stems 5–30 cm.

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[1] **Mimulus floribundus Dougl. var. subulatus Grant, var. nov., calyx fructifer 8–9 mm. longus; fauce constricto, dentibus triangulari-subulatis, 2–3 mm. longis, patulis; corolla 1.5–2 cm. longa.—Collected in moist places along the roadside, between Hog Ranch and Hetch-Hetchy Valley, 4200 ft. alt., 16 June, 1917, *Adele Lewis Grant 970* (Gray Herb., U. S. Nat. Herb., Mo. Bot. Gard. Herb. no. 849666, TYPE, and Univ. Calif. Herb.).**

long, the whole plant densely viscid-villous; leaves numerous, thin, broadly ovate, acute, 1.5–2 cm. long, 1.2–1.5 cm. wide, base cuneate, cordate, or broadly triangular, petioles shorter than the blade, irregularly denticulate; pedicels filiform, much longer than the leaves; calyx campanulate, acutely angled, little or not at all inflated in fruit, 7–8 mm. long, teeth short, broadly triangular, 1–1.5 mm. long, mucronate or often 2–3-cleft, subequal, ciliate; corolla funnelform, bilabiate, 16–18 mm. long, yellow, tube slender, twice as long as the calyx, throat and lobes short; stamens included; stigma-lips equal; capsule lanceolate, shorter than the calyx, stipitate, placentae adherent to the apex; seeds oval, minutely papillate.

Distribution: in damp places in Washington and Oregon. Rarely collected.

Specimens examined:

Washington: on steep, overhanging, damp cliffs near Bingen, 11 Aug.–Nov., 1892, *Suksdorf 1470* (N. Y., F., and M, *type collection*).

Oregon: Rainier, 1893, *Briggs* (Phil.).

46. **M. moschatus** Dougl. in Lindl. Bot. Reg. *pl. 1118.* 1828; Benth. Scroph. Ind. 29. 1835; DC. Prodr. **10**: 372. 1846, in part; Hook. Fl. Bor. Am. **2**: 99. 1840; Gray in Bot. Calif. **1**: 569. 1876, in part; Syn. Fl. N. Am. **2**^{1}: 27. 1878, ed. 2, and Suppl. 447. 1886; Greene in Bull. Calif. Acad. Sci. **1**: 118. 1885; Manual Bay Region, 276. 1894; Conzatti & Smith, Fl. Sin. Mex. 117. 1897; Howell, Fl. Northwest Am. 522. 1901; Eastwood, Fl. South Fork King's River, Sierra Club Publ. 27: 65. 1902; Abrams, Fl. Los Angeles, 365. 1904, and ed. 2, 336. 1917; Piper, Contr. U. S. Nat. Herb. **11**: 509. 1906, in part; Fl. Southeast Wash. and Adj. Idaho, 228. 1914, in part; Nelson in Coulter & Nelson, Manual Cent. Rocky Mountains, 454. 1909, in part; Henry, Fl. Brit. Columbia, 268. 1915; Rydb. Fl. Rocky Mountains, 779. 1917.

A more or less slimy, viscid-villous perennial; rootstocks slender, often moniliform, stems 5–30 cm. long, creeping or decumbent, rooting at the lower nodes; leaves ovate, 1–4 cm. long, .5–2 cm. wide, acute or obtuse, entire or sparingly denticulate, base sometimes subcordate or nearly truncate, short-petioled, pinnately-veined; flowers few, pedicels slender, shorter than the leaves; calyx campanulate, 8–10 mm. long, teeth lanceolate, acute or often subulate, unequal, frequently nearly one-third the length of the tube; corolla funnelform, 1.4–2 cm. long, yellow, tube cylindrical, exserted, throat short, usually striped with red and with two densely bearded lines below the lower lip, lobes rounded, subequal; stamens included, filaments glabrous, anthers pubescent, coherent nearly to the base; style glabrous, stigma-lips broad, rounded, equal, fimbriate; capsule ovate, acuminate, included, placentae adherent to the apex; seeds oval, tuberculate.

Distribution: moist places in mountain regions from Montana and British Columbia to southern California. It has become established in various parts of Europe and eastern North America.

Specimens examined:

Montana: Helena, Aug., 1892, *Starz* (M); Coeur D'Alene, near Borax, 6000 ft. alt., 8 Aug., 1902, *Blankinship* (M); Summit, Great Northern Ry., 25 July, 1894, *Williams* (R. Mt.).

Wyoming: East de Lacy's Creek, Yellowstone Park, 10 Aug., 1897, *Rydberg & Bessey 4942* (R. Mt.); Yellowstone Park, 5 Aug., 1885, *Letterman* (M).

Idaho: Lake Waha, Nez Perces Co., 3500–4000 ft. alt., 25 June, 1896, *Heller & Heller 3315* (M and Cornell); about Lake Coeur d'Alene, June–July, 1892, *Aiton* (M); Forks of St. Mary's River, Coeur d'Alene Mts., 4 July, 1895, *Leiberg 1168* (M); wet sunny ground, along creeks, Cedar Mts., near Moscow, 7 July, 1894, *Henderson* (Cornell and R. Mt.); Cedar Mts., June, 1896, *Elmer 8074* (Pomona); Bald Knob, Cedar Mt., Latah Co., 20 June, 1892, *Sandberg, McDougal & Heller 444* (Stanford); moist sand, Silver City, Owyhee Co., 7000 ft. alt., 18 July, 1910, *Macbride 421* (M and R. Mt.); Trinity, Elmore Co., 9 Aug., 1910, *Macbride 569* (M and R. Mt.); Tamarack, Washington Co., 11 Aug., 1911, *Clark 230* (M and R. Mt.); shady stream bottoms, Boise, 2880 ft. alt., 18 June, 1910, *Macbride 261* (R. Mt.); Boise Basin, July, 1892, *Mulford* (M); river banks, Kootenai Co., July, 1891, *Leiberg 383* (Pomona).

Utah: vicinity of Clayton Peak, Wasatch Mts., 12–26 Aug., 1903, *Stokes* (M); Peterson, Weber River, 18–24 July, 1902, *Pammel & Blackwood 3784* (M); Big Cottonwood Cañon, below Silver Lake, 27 June, 1905, *Rydberg & Carlton 5354* (R. Mt.).

British Columbia: near mouth of Downie Creek, 9 Aug., 1905, *Shaw 1119* (M); deep thicket, east of Nelson, 15 June, 1905, *Shaw 662* (M); Kootenai River, 1 July, 1890, *Macoun* (M); Skagit River, 5 July, 1905, *Macoun 76789* (M and Cornell); Illecillewaet Valley, Loop Trail, Glacier, 3500–4000 ft. alt., 20 July, 1906, *S. Brown 662* (M); river bottoms, Vancouver Island, 7 Aug., 1902, *Rosendahl 895*, in part (Stanford); margins of grassy springs near Fort Vancouver, 1825, *Douglas* (G).

Washington: Lookout Mt., Whatcom Co., 23 Aug., 1914, *Muenscher 964* (Cornell); Stevens Pass, Cascade Mt., 3950 ft. alt., 16 Aug., 1893, *Sandberg & Leiberg 362* (M); Tacoma, 16 July, 1880, *Engelmann* (M); Mt. Constitution, San Juan Islands, 25 June–1 Aug., 1917, *Zeller & Zeller 12021* (M); Newman Lake, 14 Aug., 1912 *Turesson 28* (M); Kalama, 27 July, 1918, *Roush 2, 3* (Cornell and M); near Montesano, Chehalis Co., 9 July, 1917, *J. M. Grant* (Cornell); swamps, Sequim, Aug., 1915, *J. M. Grant* (M).

Oregon: stream banks in mountains of Lake Co., 21 Aug., 1901, *Cusick 2773* (M, Cornell, and R. Mt.); wet granitic soil, Wallowa Mts., Aug., 1906, *Cusick 3116* (M and Stanford); Portland, 5 July, 1903, *Lunell* (R. Mt.); near Portland, 1 Aug., 1880, *Engelmann* (M); Sullivan's Gulch, Portland, 14 July, 1902, *Sheldon S10880* (M); Cottonwood Creek Cañon, 1325 ft. alt., 3 June, 1897, *Sheldon 8242* (M); Big Cañon, Wallowa Co. 24 Aug., 1897, *Sheldon 8773* (M); wet meadow, vicinity of Oregon City, 11 June, 1905, *Lyon 58* (Stanford); Deer Creek Valley, Josephine Co., 4–16 July, 1919, *Dale* (Stanford); Calapooya Valley, 18 July, 1899, *Barber* (R. Mt.); Queen's Branch, Jackson Co., 25 June, 1892, *Hammond 312* (M); near Canyonville, Aug., 1922, *Epling 5378* (Epling); Crater Lake National Park, 20 July, 1918, *Heller 13060* (M).

California: Mt. Bidwell, Modoc Co., 7 Aug., 1918, *Jepson 7855* (Calif.); in the "Horse pasture" near the summit of Mt. Sanhedrin, Lake Co., 20 July, 1902, *Heller 5923* (Cornell, M,

R. Mt., and Pomona); Cosumnes, Eldorado Co., 28 Aug., 1896, *Hansen 1908* (Stanford); Yosemite Valley, 4–12 July, 1901, *G. B. Grant 4245* (Stanford); Mariposa, 30 April, 1895, *Congdon* (Stanford); Crane Flat, Yosemite, 15 Aug., 1872, *Redfield 6121a* (M); Yosemite Falls, 5300 ft. alt., 25 June, 1911, *Jepson 4272* (Calif.).

This plant is commonly cultivated in American and European gardens. The musk-like odor is very characteristic and varies in intensity with the time of the day and with the individual plants, some appearing to be scentless at one time and fragrant at another. The moniliform rootstocks, the main character on which Dr. Greene based *M. moniliformis,* are found on specimens of typical *M. moschatus.*

46a. Var. **longiflorus** Gray, Syn. Fl. N. Am. **2**^{1}: 278. 1878, ed. 2, and Suppl. 447. 1886; Curran in Proc. Calif. Acad. Sci. II. **1**: 263. 1888; Hall, Yosemite Fl. 221. 1912. Pl. 9, fig. 3.

M. moschatus Maund, Bot. **3**: 283, *pl. 71.* 1829–30, not Douglas.

M. dentatus var. *gracilis* Gray in Bot. Gaz. **7**: 112. 1882.

M. moniliformis Greene in Bull. Calif. Acad. Sci. **1**: 10. 1884, and 119. 1885; Gray, Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 447. 1886; Eastwood, Fl. South Fork King's River, Sierra Club Publ. 27: 65. 1902; Hall, Yosemite Fl. 222. 1912; Smiley in Univ. Calif. Publ. Bot. **9**: 334. 1921.

M. moschatus var. *pallidiflorus* Suksd. Deut. Bot. Monatsschr. **18**: 154. 1900.

Rootstocks often moniliform; stems more nearly erect, commonly viscid-villous, occasionally nearly glabrous; calyx 8–11 mm. long, teeth nearly equal and shorter than in the species; corolla 2–3 cm. long, the tube twice as long as the calyx.

Distribution: wet places in the mountains from British Columbia to California. This is the common form in California.

Specimens examined:

British Columbia: Chilliwack Valley, 3000 ft. alt., 26 July, 1901, *Macoun 54474* (M); Kootenai River, 1 July, 1890, *Macoun* (G and M); Port Alberni, Vancouver Island, 27 June, 1916, *Henry 9054* (G).

Washington: springs near Chenowith, Skamania Co., 7 July, 1894, *Suksdorf 2320* (N. Y. and M); in wet peat-like swamps near Doubtful Lake near the summit of Cascade Pass, Sept., 1897, *Elmer 745* (M, R. Mt., and Pomona); springy places, W. Klickitat Co., 18 June, July, 1885, *Suksdorf* (M and Stanford).

California: Log Lake, Shackleford Creek, Siskiyou Co., 5 June, 1910, *Butler 1511* (M, R. Mt., and Stanford); damp soil, Shackleford Creek, 4000 ft. alt., 8 July, 1910, *Butler 1685* (R. Mt. and Stanford); near Shasta Springs, Siskiyou Co., 5 June, 1905, *Heller 7960* (M and Stanford); north side, Mt. Shasta, Siskiyou Co., 11–16 June, 1897, *H. E. Brown 405* (M and R. Mt.); Deetz Station, near Black Butte, 3800 ft. alt., 25 Aug., 1914, *Heller 11714* (Cornell, M, and Stanford); Klamath River near Requa, Del Norte Co., June, 1899, *Dudley* (Stanford); Forestdale, Modoc Co., July, 1898, *M. S. Baker 545* (Calif.); Coffee Creek, Salmon Mts., Trinity Co., July, 1909, *H. M. Hall 8555* (R. Mt.); Lassen's Peak, Aug., 1896, *Austin 395* (G and M); Pine Creek, Lassen Co., 9 July, 1894, *Baker & Nutting* (R. Mt.); Martin Springs, Lassen Co., 30 July, 1922, *Brown & Wieslander 17* (Cornell and Calif.); Squirrel Creek, vicinity of Quincy, Plumas Co., 29 June, 1919, *Wagner 300* (Stanford); near Lassen Buttes, Plumas Co., 6000 ft. alt., 15–31 Aug., 1897, *H. E. Brown 669* (M and R. Mt.); near the summit of Soapstone Ridge, Plumas Co., 7 July, 1915, *Heller 12064* (M and Stanford); Red Point, Placer Co., 4500 ft. alt., July, 1892, *Price* (Stanford); near Prattville at Clear Creek, 5000 ft. alt., 2 July, 1897, *Jones* (M); in coarse granitic sand, west of Emigrant Gap, Placer Co., 12 Aug., 1917, *Heller 12875* (M and Stanford); Cisco, 1870, *Kellogg & Branner* (G); Bear Valley, Nevada Co., 4500 ft. alt., 20 July, 1898, *Jepson 51m* (Calif.); Cahto to Westport, Mendocino Co., 30 July, 1897, *Jepson 42m* (Calif.); Soldier's Ridge, Mendocino Co., 24 July, 1897, *Jepson 45m* (Calif.); summit of Yuba Pass, July, 1913, *Ames 19* (Calif.); about Summit Station, Nevada Co., 20 July, 1903, *Heller 6973* (M, R. Mt., Stanford, and Pomona); lower end of Donner Lake, Nevada Co., 16 July, 1903, *Heller 6947* (M, Stanford, and Pomona); Nevada Co., 1892, *Michener & Bioletti* (M); Sierra Valley, Sierra Co., without date, *Lemmon 72* (G and M); Little Chico Creek, Butte Co., March, 1896, *Austin 147* (M); Chico Meadows, Butte Co., 4000 ft. alt., 22 June, 1914, *Heller 11511* (Cornell, M, and Stanford); Coast Range west of Alder Springs, Glenn Co., 5300 ft. alt., 5 July, 1917, *Heller 12797* (M); near Echo Camp, Eldorado Co., 7000 ft. alt., 6 Aug., 1915, *Heller 12165* (Cornell, M, and Stanford); Summit, Aug., 1883, *Greene* (M and G); Donner Lake, Nevada Co., July, 1891, *Sonne 268* (M); Glen Alpine, Eldorado Co., 12 July, 1898, *Price* (Stanford); Lake Tahoe, 1 Aug., 1891, *Evans* (M); Bear River, Amador Co., 5500 ft. alt., 30 July, 1896, *Hansen 1951* (M); Doak's Ridge, Amador Co., 4000 ft. alt., July, 1892, *Hansen 465* (M and Stanford); Snowdon Ranch, Calaveras Co., 7 Aug., 1890, *Jepson 46m* (Calif.); Strawberry, Tuolumne Co., 16 July, 1915, *A. L. Grant 55* (Cornell); banks of Tuolumne River, Big Oak Flat Road, Tuolumne Co., 24 July, 1918, *Ferris 1458* (Stanford); Crocker's, Tuolumne Co., 3 Aug., 1911, *Jepson 4640* (Calif.); Brightman's Flat, Tuolumne Co., 3 Aug., 1916, *A. L. Grant 892* (Cornell and Stanford); Hog Ranch, above Hetch-Hetchy Valley, 16 June, 1917, *A. L. Grant 984* (Cornell, M, Calif., and Stanford); Big Creek, Big Oak Flat Road, Tuolumne Co., 22 June, 1919, *Jepson 8342* (Calif.); Little Yosemite, 6300 ft. alt., 6 July, 1909, *Jepson 3161a* (Calif.); Hazel Green, 5–6 July, 1896, *Jepson 44m* (Calif.); Lake Merced, Yosemite Park, 13 July, 1911, *Jepson 4429* (Calif.); Yosemite Valley, 22 June, 1911, *Abrams 4464* (Stanford); Yosemite Valley, 4–12 July, 1901, *G. B. Grant 4242* (Stanford); Yosemite Valley, 12 June, 1891, *Fritchey 25* (M); near Wawona, 15 June, 1891, *Fritchey 86* (M); Graveyard Meadow, Fresno Co., 18 Aug., 1918, *A. L. Grant 1514a* (Calif.); bog, King's River Cañon, near entrance to Bubbs Creek, 15 June, 1921, *Ottley 1486* (Wellesley and Cornell); Huntington Lake, Fresno Co., 7000 ft. alt., 26 July, 1917, *A. L. Grant 1175* (Wellesley, Cornell, M, Ore., Calif., and Pomona); Huntington Lake, Fresno Co., 31 July, 1918, *A. L. Grant 1468* (U. S., Cornell, and M); Pine Ridge, Fresno Co., 15–25 June, 1900, *Hall & Chandler 212* (M and Stanford); second dry meadow creek crossing, Kern

River, 15 July, 1895, *Dudley 687* (Stanford); near Methusaleh Big Tree, region of Middle Tule River, 28 July, 1895, *Dudley 921* (Stanford); wet places, woods near Middle Tule River, 5000–6000 ft. alt., Apr.–Sept., 1897, *Purpus 5619* (M); Round Meadow, Tulare Co., July, 1902, *G. B. Grant 1930* (Stanford); Round Meadow, Giant Forest, 24 June–2 July, 1900, *Jepson 680a* (Calif.); Freeman Creek, Kern River, 7000 ft. alt., 28 June, 1912, *Jepson 4883* (Calif.); Kern River Cañon, 6500 ft. alt., 6 July, 1912, *Jepson 4980* (Calif.); Inverness, Marin Co., 13 Aug., 1922, *Jepson 9803* (Cornell); Swanton, Santa Cruz Co., 1912, *Rich* (Stanford); San Gabriel Mts., Los Angeles Co., 31 Aug., 1917, *F. Grinnell, Jr.* (Stanford); Swartout Canyon, desert slopes of San Gabriel Mts., 6500 ft. alt., 5 July, 1908, *Abrams & McGregor 648* (Stanford); Swartout Canyon, San Antonio Mts., 6800 ft. alt., 3–6 June, 1900, *H. M. Hall 1523* (Stanford); moist places, San Bernardino Mts., 14 July, 1899, *H. M. Hall 1292* (M and R. Mt.); Bear Valley, San Bernardino Mts., Aug., 1882, *Parish & Parish 1463* (M); wet bank near Strawberry Flat, San Bernardino Mts., 5500 ft. alt., 21 June, 1916, *Parish 10952* (Stanford); Little Bear Valley, San Bernardino Mts., Aug., 1884, *Parish & Parish 1463* (Stanford); Hunsaker Flats, San Bernardino Mts., 5200 ft. alt., 8 June, 1919, *Munz & Johnston 2858* (Pomona); wet meadow, Tahquitz Valley, San Jacinto Mt., 7500 ft. alt., 8 Aug., 1903, *Jepson 2300* (Calif.); San Jacinto Mts., 6000 ft. alt., 1 July, 1892, *Hasse* (M); near brook in woods, Idyllwild, San Jacinto Mt., 5300 ft. alt., 1 July, 1921, *Spencer 1288* (Pomona); Smith Mt., 4500 ft. alt., July, 1895, *Stokes* (Stanford); Smith Mt., San Diego Co., 25 July, 1882, *Orcutt 432* (M).

An interesting aberrant form has been noted by J. K. Henry in some plants he collected on Vancouver Island. All the petals were lobed with a cuspidate point at the base of each notch. The specimens of Mrs. K. Brandegee, collected at Giant Forest, Tulare Co., California, have emarginate petals.

46b. Var. **sessilifolius** Gray, Syn. Fl. N. Am. ed. 2, 2^1: Suppl. 447. 1886; Curran in Proc. Calif. Acad. Sci. II. **1**: 262. 1888; Greene, Manual Bay Region, 276. 1894; Jepson, Fl. W.M id.

Calif. 408. 1901, and ed. 2, 380. 1911; Abrams, Fl. Los Angeles, 366. 1904, and ed. 2, 336. 1917; Henry, Fl. Brit. Columbia, 268. 1915.

M. inodorus Greene in Bull. Calif. Acad. Sci. **1:** 119. 1885.

Stems more nearly erect; upper leaves closely sessile by a broad base, lower leaves sometimes short-petioled; pedicels divaricate, elongated, often as long as the leaves, calyx 9–11 mm. long, enlarging in fruit, teeth unequal, sometimes one-half the length of the tube; corolla 2–3 cm. long.

Distribution: in wet places from British Columbia to southern California.

Specimens examined:

British Columbia: river bottoms, Vancouver Island, 7 Aug., 1902, *Rosendahl 895a* (M and R. Mt.); near Esquimault Harbor, Vancouver Island, 8 Aug., 1899, *Barber 179* (G); Elk Creek, near Victoria, 13 June, 1908, *Macoun 87657* (G).

Washington: Clallam, July, 1900, *Elmer 2589* (M, Stanford, and Pomona); Seattle, 26 June, 1889, *E. C. Smith* (M); Seattle, July, 1915, *Freiberg* (M); Seattle, 18 May, 1910, *Zeller* (M); Tacoma, 28 May, 1896, *Flett 130* (Cornell); Trout Lake, near Friday Harbor, 18 Sept., 1904, *Berg 10* (Stanford); near Montesano, Chehalis Co., 27 June, 1898, *Heller & Heller 3961* (G, Cornell, and M); Brooklyn, King Co., 20 June–12 July, 1898, *Savage, Cameron & Lenacker* (M).

Oregon: Oregon, 1871, *E. Hall 376* (G and M); gravelly stream bank, Salem, 31 May, 1915, *J. C. Nelson 202* (Stanford).

California: near Sisson, Siskiyou Co., 24 July–10 Aug., 1894, *Jepson 43m* (Calif.); Squaw Creek Ranger Station, Shasta Co., June, 1916, *Drew* (Stanford); rocks along South Yuba River, Nevada Co., 14 June, 1893, *Dudley* (Stanford); Chico, 1885, *Gray* (G); moist open places, Butte Meadows, Butte Co., 26 July, 1917, *Heller 12829* (Cornell, M, and Stanford); Arcata to Trinidad, Humboldt Co., 18 July, 1916, *Abrams 6107* (Stanford); Albion River, Mendocino Co., May, 1902, *McMurphy 297* (Stanford); Ft. Bragg, 1914, *Mathews 135* (Calif.); in ditch by roadside, Fort Bragg, Mendocino Co., 25 June, 1921, *Ottley 1516* (Wellesley, M, and Cornell); Wolf Creek between Willits and Laytonville, Mendocino Co., 6 July, 1916, *Abrams 5836* (Stanford); forest near Little Lake, Mendocino Co., June, 1882, *Rattan* (Stanford); Guerneville, Sonoma Co., 14 June, 1877, *Rattan* (Stanford); Howell Mt., June and Sept., 1888, *K. Brandegee* (M and Stanford); Angwin's Meadows, Howell Mt., 26 June, 1893, *Jepson 47m* (Calif.); Horse Mt., N. Lake Co., July–Aug., 1893, *Jepson 48m* (Calif.); Mill Valley, Marin Co., 19 July, 1891, *Jepson 49m* (Calif.); Gilroy to Santa Cruz, 16 June, 1896, *Jepson 50m* (Calif.); Boulder Creek, Santa Cruz Co., 3 Aug., 1902, *H. A. Walker 713* (Pomona); Santa Cruz, 20 June, 1903, *C. H. Thompson* (M); springy places near Glendale, Los Angeles Co., 5 June, 1888, *Hasse* (Stanford); Fredalba, San Bernardino Mts., 22 July, 1902, *Abrams 2800* (M); along small stream, Big Bear Valley, 6500 ft. alt., 4 July, 1920, *Harwood 4347* (Pomona); Swartout Valley, San Antonio Mts., 7500 ft. alt., 17 June, 1921, *Munz 4615* (Pomona); wet bank, Strawberry Flat, San Bernardino Mts., 5500 ft. alt., 21 June, 1916, *Parish 10951* (Stanford); California, 1891, *Hartweg* (G).

47. M. Leibergii Grant[1] Pl. 6, fig. 1.

A low, loosely branched, glabrous perennial; stems 2–3 dm. long, weak, reclining or suberect, rooting from the nodes; leaves thin, ovate or oblong, 1.8–3 cm. long, 7–13 mm. broad, acute or obtuse, denticulate, mostly with short winged petioles, pinnately-veined, internodes and ascending pedicels longer than the leaves; calyx campanulate, 1–1.3 cm. long, not accrescent, minutely puberulent, teeth triangular-subulate, 3–4 mm. long, equal, recurved, minutely ciliate; corolla 1.8–2 cm. long, pale pink, tube included, throat funnelform with a hairy ring at the base of the lobes and two densely hairy ridges below the lower lip, lobes apparently nearly equal, little spreading; stamens and style included, glabrous, filaments flattened, stigma-lips equal, broadly rounded; capsule ovate, acute, as long as the calyx-tube, placentae adherent to the apex; seeds oval, favose-areolate.

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[1] **Mimulus Leibergii** Grant, sp. nov., perennis glabrus; caulibus infirmis, resupinis suberectisve, 2–3 dm. longis; foliis tenuibus, ovatis oblongisve, fere brevi-petiolatis, penninervibus, denticulatis; pediculis foliis longioribus; calyce 1–1.3 cm. longo, dentibus triangulari-subulatis, 3–4 mm. longis; corolla pallida rosea, 1.8–2 cm. longa.—Collected in wet soil along creek on Mt. Pleasant of the Spanish Peak Range, California, 6500 ft. alt., 16 July, 1900, *John B. Leiberg 5171* (U. S. Nat. Herb., no. 610415, TYPE).

Distribution: known only from the type locality.

Specimens examined:

California: in wet soil along creek on Mt. Pleasant of the Spanish Peak Range, 6500 ft. alt., 16 July, 1900, *Leiberg 5171* (U. S., TYPE).

48. **M. alsinoides** Dougl. in Benth. Scroph. Ind. 29. 1835; Hook. Fl. Bor. Am. **2**: 100. 1840; Benth. in DC. Prodr. **10**: 372. 1846; Gray in Proc. Am. Acad. **11**: 98. 1876; Syn. Fl. N. Am. **2**^{1}: 277. 1878, ed. 2, and Suppl. 449. 1886; Greene in Bull. Calif. Acad. Sci. **1**: 115. 1885; Howell, Fl. Northwest Am. 521. 1901; Piper, Fl. Northwest Coast, 324. 1915; Henry, Fl. Brit. Columbia, 269. 1915.

M. alsinoides β *paniculatus* Benth. Scroph. Ind. 29. 1840.

Stems nearly glabrous, erect, simple or more often diffusely branched, 4–30 cm. long; leaves broadly ovate or rhomboid-ovate, 2–6 cm. long, 1–3 mm. wide, thin, glabrous, yellowish-green, irregularly dentate, 3–5-nerved, the base sometimes truncate but more often narrowed abruptly to the long-margined petiole, the latter at least as long as the blade; internodes and the erect or spreading filiform pedicels usually longer than the leaves; calyx 4–6 mm. long, narrow, oblong, minutely puberulent, plicate-angled, fruiting calyx 7–9 mm. long, not inflated, teeth unequal, the 2 lower ones truncate and longer than the 3 short triangular-acute or mucronate upper ones; corolla bilabiate, funnelform, 1–1.3 cm. long, yellow, tube slightly exserted, lobes erose or emarginate, the middle lobe of the lower lip spreading and nearly twice as long as the lateral lobes or the 2 erect upper ones and with a large reddish spot near its base; stamens glabrous, the upper pair slightly exserted; style glabrous, exserted, stigma-lips unequal, oblong; capsule oblong-acuminate, usually slightly exserted, placentae adherent to the apex; seeds oblong, smooth.

Distribution: in wet places from British Columbia to northern California.

Specimens examined:

British Columbia: Esquimalt, Vancouver Island, 12 June, 1901, *Macoun 87669* (Cornell); Chilliwack Valley, 29 June, 1901, *Macoun 54483* (G and M); vicinity of Victoria, 8 May, 1893, *Macoun 703* (G); Victoria, 18 April, 1900, *Pineo* (Calif.); Vancouver, July, 1913, *Henry* (R. Mt.).

Washington: in shade on damp rocks, Columbia River, W. Klickitat Co., 21, 23 May, 1884, *Suksdorf 687* (M); damp cliffs in shade, Columbia River, W. Klickitat Co., 23 May, 1884, *Suksdorf 420* (G); dry bluffs, La Camas, 31 May, 1884, *Henderson* (Stanford); Columbia River, *Nuttall* (G).

Oregon: wet sunny bluffs, Portland, 17 April, 1884, *Henderson* (Stanford); Rooster Rock, May, 1884, *Howell* (Stanford); rocky places, western Oregon, April, May, 1880, *Howell* (M); opposite Oswego, 17 May, 1893, *Howell 454* (R. Mt. and Calif.); Willamette, 1877, *Howell* (G); wet rocks, Multnomah Falls, 8 April, 1914, *Peck 5623* (G); Multnomah Falls, April, 1884, *Howell* (Phil.); Rock Spur, Clackamas Co., 17 April, 1903, *Sheldon 11863* (Stanford); Brookings, June, 1916, *Thompson 140* (Stanford); rock crevices, Falls City, 12 May, 1917, *J. C. Nelson 1136* (G); The Dalles, April, 1886, *Davidson* (Pomona); on rocks, Dalles, 12 April, 1903, *Lunnell* (G); Oregon, 1871, *E. Hall 378* (Phil. and M); Oregon, 1868–1869, *Kellogg & Harford 683* (G).

California: 1 May, 1876, *Greene 734* (Phil. and M); near Kneeland Prairie, Humboldt Co., June, 1882, *Rattan* (G and Stanford); wet bank in brush patch, Kneeland Prairie, Humboldt Co., 8 June, 1908, *Tracy 2634* (Calif.).

48a. Var. **minimus** Benth. Scroph. Ind. 29. 1835; DC. Prodr. **10**: 372. 1846; Hook. Fl. Bor. Am. **2**: 100. 1840; Gray in Proc. Am. Acad. **11**: 98. 1876; Syn. Fl. N. Am. **2**^{1}: 277. 1878, ed. 2, and Suppl. 449. 1886.

Very small plants, 1–3.5 cm. high; calyx 3–5 mm. long; corolla 5–7 mm. long; stamens exserted; capsule included.

Distribution: British Columbia and Washington.

Specimens examined:

British Columbia: Vancouver Island, 1859–60, *Wood* (G).

Washington: Columbia River, *Scouler 182* (G and N. Y.); Cascade Mts. to Fort Coville on Oregon Boundary Commission, 1860, *Lyall* (G).

M. alsinoides is most closely related to *M. Pulsiferae* with which it has often been confused. The unequal calyx-teeth, 2 of which are truncate and longer than the 3 triangular-acute upper ones, distinguish this species from any other *Mimulus* except *M. pachystylus.*

49. M. pachystylus Grant[1]

A low creeping perennial; stems 1–3 dm. long, viscid-pilose, with long soft hairs, prostrate, rooting freely from the nodes, 1–3 dm. long; leaves broadly ovate, 1–3 cm. long, .5–2 cm. wide, acute, coarsely dentate, pinnately-nerved, thick and usually glabrous, petioles short, viscid-pilose; flowers axillary, pedicels shorter than the leaves, densely viscid-pilose; calyx broadly campanulate, 9–10 mm. long, nearly glabrous, teeth short, broadly truncate, mucronate, the 2 upper teeth longer than the 3 lower ones, sometimes with smaller teeth in between, throat oblique; corolla bilabiate, 1.3–1.4 cm. long, broadly funnelform, apparently yellow, tube broad, included, throat slightly exserted, ampliate, with two densely bearded ridges below the lower lip, lobes unequal, broad, rounded; stamens glabrous, included, the upper pair sometimes longer than the style, anthers joined at least half their length; style glabrous, much thickened, sometimes with a swollen base, stigma-lobes broad, rounded, laciniate, equal; capsule ovate, attenuate, placentae adherent to the apex; seeds oval, apiculate at one end, favose areolate.

Distribution: known only from Chiapas, Mexico.

Specimens examined:

Chiapas: Cerro del Boqueron, Aug., 1913, *Purpus 7015* (U. S. and M, TYPE).

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[1] **Mimulus pachystylus** Grant, sp. nov., perennis repens; caulibus viscido-pilosis, prostratis, 1–3 dm. longis; foliis late ovatis, acutis, crasse dentatis, 1–3 cm. longis, laminibus crassis, fere glabris; petiolis brevibus, pilosis, pediculis foliis brevibus, dense viscido-pilosis; calyce prope glabro, 9–10 mm. longo, dentibus brevibus, duobus supremis tribus inferioribus longioribus; corollae labiis inaequalibus 1.3–1.4 cm. longis; staminibus glabris; stylo glabro, crasso, stigmae laciniis aequalibus; capsula ovata, attenuata.—Collected at Cerro del Boqueron, Aug., 1913, *C. A. Purpus 7015* (U. S. Nat. Herb., and Mo. Bot. Gard. Herb., no. 741579, TYPE).

50. M. Dudleyi Grant[1] Pl. 4, fig. 2.

Stems 8–15 cm. high, viscid-villous; leaves thin, broadly ovate, 2–3 cm. long, 1–2 cm. wide, acute, saliently dentate, truncate or rounded at the base, light green above and frequently tinged with red below, pinnately-veined, sparsely villous; pedicels slender, almost filiform, villous, longer than the leaves, erect in flower, spreading in fruit; calyx campanulate, 6–7 mm. long, usually tinged with red, densely viscid-villous with long white hairs, slightly inflated and broadly oval in fruit, constricted at the orifice, teeth equal, triangular-acute, ciliate, 2 mm. long; corolla somewhat bilabiate, 1.7–2.2 cm. long, yellow, tube cylindrical, almost twice as long as the calyx, throat very short, abruptly expanding to the broad spreading unequal lobes, 4–8 mm. long, the lower lip longer than the upper one and closely streaked with red toward the throat; stamens glabrous, included in the tube and inserted near its base; style little longer than the stamens, stigma-lips equal; capsule oblong, acute, shorter than the calyx-tube, placentae firmly adherent; seeds oval, slightly papillate.

Distribution: known only from Tulare Co., California.

Specimens examined:

California: rocky cliffs east of the Tule River, Tulare Co., 27 March, 1897, *Dudley* (Stanford, TYPE); Tulare Co., April, 1897, *Davy* (Pomona).

51. M. Parishii Greene in Bull. Calif. Acad. Sci. **1**: 108. 1885; Gray, Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 450. 1886; Abrams, Fl. Los Angeles, 366. 1904, and ed. 2, 336. 1917.

A stout, erect, densely glandular-villous annual; stem 1.5–4 dm. high, simple or mostly branching from the base; leaves ovate to lanceolate-oblong, 1.5–5 cm. long, .3–1.7 cm. wide, clasping by a broad sessile base, irregularly dentate, obscurely 3-nerved, grayish-green; inflorescence paniculate; pedicels slender, shorter than the leaves, erect, somewhat spreading; calyx oblong, membranaceous, pale grayish-green, 8–9 mm. long, fruiting calyx 1–1.2 cm. long, not inflated, teeth short, 1–2 mm. long, equal, broadly deltoid-acute, the margins sparsely glandular-ciliate; corolla pale pink to rose or lilac, rarely white, 1–1.3 cm. long, tube and throat included, lobes subequal, exserted, erect, truncate or rounded and slightly erose; stamens included, glabrous; style and stigma slightly exserted, glabrous; stigma-lips unequal, oblong; capsule included, chartaceous; seeds oblong, smooth, apiculate at each end.

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[1] **Mimulus Dudleyi** Grant, sp. nov., caulis viscido-villosus, 8–15 cm. longus; foliis late ovatis, acutis, petiolatis, acute dentatis; pediculis foliis longioribus; calyce 6–7 mm. longo, dentibus triangulari-acutis, aequalibus; corolla 1.7–2.2 mm. longa, flava, fauce brevi, laciniis latis, inaequalibus, labio inferiore rubro-lineato; staminibus styloque brevibus; stigmae laciniis aequalibus; capsula inclusa, oblonga.—Collected on rocky cliffs east of the Tule River, Tulare Co., 27 March, 1897, *W. R. Dudley* (Stanford Univ. Herb., no. 21830, TYPE).

Distribution: along streams in the desert mountain regions of southern California.

Specimens examined:

California: Cox's Ranch, Mohave River, Aug., 1882, *Parish & Parish 1465* (U. S., F, Calif., and Stanford, *type collection*); Rock Springs, north side of San Bernardino Mts., June, 1886, *Parish 1460* (U. S. and Greene); Rock Springs, north side of San Bernardino Mts., 13 June, 1888, *Parish* (U. S.); Rock Springs, borders of Mohave Desert, June, 1886, *Parish* (Calif.); Rock Creek, 1 Aug., 1901, *Davidson* (Stanford); Rock Creek, San Gabriel Mts., 4750 ft. alt., 16 June, 1918, *Pierson 199* (Calif.); Rock Creek, San Gabriel Mts., 3800 ft. alt., 2–4 July, 1908, *Abrams & McGregor 559* (U. S. and Stanford); Los Angeles Co., June, 1884, *Nevin 1068* (G); Big Meadows, San Bernardino Mts., 7000 ft. alt., 26 July, 1906, *H. M. Hall 7571* (M, R. Mt., and Calif.); river banks, Victorville, 25 June, 1915, *Parish 10537* (G and Stanford); Palm Cañon, near Mt. San Jacinto, 22 May, 1901, *Jepson 1402* (Calif.); wet ground, Coyote Hole, Little San Bernardino Mts., 3000 ft. alt., 6 May, 1922, *Munz & Johnston 5202* (Pomona); wet sandy wash, Smith Water Canyon, near Quail Springs, Little San Bernardino Mts., 7 May, 1922, *Munz & Johnston 5215* (Pomona).

Mexico:

Lower California: San Rafael, northern Lower California, 19 Sept., 1884, *Orcutt* (M).

52. M. Lewisii Pursh, Fl. Am. Sept. **2**: 427, *pl. 20*. 1814; Benth. Scroph. Ind. 28. 1835; DC. Prodr. **10**: 370. 1846;

Gray in Proc. Am. Acad. **11**: 98. 1876; Bot. Calif. **1**: 566. 1876; Syn. Fl. N. Am. **2**^{1}: 276. 1878, and ed. 2, 1886; Greene in Bull. Calif. Acad. Sci. **1**: 108. 1885; Howell, Fl. Northwest Am. 519. 1901; Piper, Contr. U. S. Nat. Herb. **11**: 508. 1906; Fl. Southeast Wash. and Adj. Idaho, 227. 1914; Nelson in Coulter & Nelson, Manual Cent. Rocky. Mountains, 453. 1909; Hall, Yosemite Fl. 222. 1912. Pl. 8, fig. 2.

M. Lewisii var. *exsertus* Coult. & Fisher in Bot. Gaz. **18**: 302. 1893.

M. roseus Dougl. in Bot. Reg. *pl. 1591.* 1833; Lodd. Bot. Cab. *pl. 1976.* 1833; Hook. in Curtis, Bot. Mag. II. **8**: *pl. 3353.* 1834; D. Don, Brit. Flower Gard. **4**: *pl. 210.* 1835.

M. roseus var. *glabrior* Hook. Fl. Bor. Am. **2**: 100. 1840.

M. Lewisii var. *tetonensis* A. Nels. in Bot. Gaz. **34**: 31. 1902.

M. Lewisii var. *alba* Henry, Fl. Brit. Columbia, 268. 1915.

M. Lewisii f. *tetonensis* (Nels.) Macb. & Pays. in Contr. Gray Herb. N. S. **49**: 67. 1917.

Stems from a running rootstock, erect, 3–7.5 dm. high, mostly simple, the whole plant more or less viscid-pubescent; leaves thin, oblong or oblong-lanceolate to ovate-oblong, 2.5–7 cm. long, 1–2.7 cm. wide, 3–5-nerved from the base, irregularly dentate with short subulate teeth, occasionally almost entire, sessile by a broad base; pedicels erect, usually much longer than the leaves; calyx tubular or somewhat campanulate, often tinged or dotted with red, 1.5–2.5 cm. long, sharply angled, teeth mostly equal, broadly triangular at the base, becoming subulate, 4–6 mm. long; corolla 3.3–5.5 cm. long, rose-red to pale pink, with darker lines down the throat, often more or less blotched with red, occasionally white or yellowish-white, lobes rounded, erose or sometimes emarginate, nearly equal and little spreading, 8–10 mm. long, tube exserted, yellow or white below the lower lip, throat ampliate, sparingly bearded, sometimes spotted; stamens included, anthers more or less villous on the back with narrow, flattened hairs, filaments glabrous; style slightly longer than the stamens, stigma-lips broad and rounded; capsule oblong, included; seeds oblong, longitudinally wrinkled.

Distribution: common along streams above 4000 ft. alt., from the Rocky Mountain states west to British Columbia and California. The type was collected by Meriwether Lewis on the Lewis & Clark Expedition.

Specimens examined:

Alberta: Glacier track, Alberta, 21 July, 1901, *Waldron 142* (R. Mt.).

British Columbia: Burnt Woods, Spillimacheen Valley, 6600 ft. alt., 3 Aug., 1904, *Shaw 434* (M and R. Mt.); by a rivulet, alpine meadow in the Big Bend District, 6000 ft. alt., 24 July, 1905, *Shaw 984* (M); west of Skagit River, 17 Aug., 1905, *Macoun 76792* (Pomona); Chilliwack Valley, 29 June, 1901, *Macoun 54485* (M); Griffin Lake, 6 July, 1890, *Macoun* (M); Glacier, July, 1896, *Dudley* (Stanford); Glacier, Asulkan Valley, 4100–6000 ft. alt., 19 July, 1906, *S. Brown 588* (Phil. and M).

Montana: Spanish Peaks, 20 July, 1901, *Vogel* (R. Mt.); stream margins, Sourdough Cañon, near Bozeman, 6000 ft. alt., 11 July, 1905, *Blankinship 390* (M); Granite Park, 6200 ft. alt., Aug., 1910, *Kirkwood 28, 29* (M and Pomona); Bozeman Cañon, 6000–7000 ft. alt., 27 July, 1898, *Blankinship* (M); Helena, July, 1892, *Starz* (M); stream beds, Yellowstone Lake shore, 8000 ft. alt., 1 Aug., 1907, *Essig* (Pomona); Mountain Pass, Sperry Glacier, 1 Sept., 1903, *Umbach 796* (Stanford); MacDougal Peak, 31 July, 1908, *Clemens* (Stanford); Summit, Swan Mts., 6500 ft. alt., 5 Aug., 1906, *Elrod* (Stanford); mountain streams, White Sulphur Springs, 6500 ft. alt., 16 July, 1883, *Scribner 189* (Phil); Summit, Great Northern Railway, 25 July, 1894, *R. S. Williams* (R. Mt.).

Wyoming: wet banks, Little Goose Cañon, Sheridan Co., 28 July, 1901, *Nelson 8523* (Cornell, M, and R. Mt.); near stony water courses, Centennial, Albany Co., 7 Aug., 1900, *Nelson 6276* (M, R. Mt., and Pomona); in creeks, Bridger Peak, Carbon Co., 22 Aug., 1903, *Goodding 1956* (M and R. Mt.); Centennial Valley, 16 July, 1895, *Nelson 1672* (Cornell, R. Mt., and M); borders of alpine brooks, 1873, *Parry 212* (M); Saratoga, 11 June, 1892, *Buffum 702* (R. Mt.); Teton Peaks, 21 Aug., 1894, *Nelson 3531* (R. Mt.); rocky creek bed, near Camp Fox, 13 Aug., 1899, *Wilkerson 10* (R. Mt.); summit of Teton's above Lee's Lake, 11000 ft. alt., 26 July 1901, *Merrill & Wilcox 1072* (G and R. Mt.); along stream, Teton Pass, 12 July, 1901, *Merrill & Wilcox 971* (G and R. Mt.); growing in damp soil between rocks, Willits Creek, 11 Aug., 1909, *Willits 364* (R. Mt.).

Idaho: near Sohons Pass, 1 Aug., 1895, *Leiberg 1424* (R. Mt. and Stanford); by running water, Trinity, Elmore Co., 10 Aug., 1910, *Macbride 571* (M, R. Mt., and Stanford); Silver City, July, 1892, *Mulford* (M); Silver City, 18 July, 1910, *Macbride 414* (M, R. Mt., and Stanford); Owyhee Mts., July, 1892, *Mulford* (M); near Sawtooth Mountain on west shore of Alturas Lake, 8000–8500 ft. alt., 26–28 July, 1896, *Evermann 650* (Stanford); Wieser Forest, Indian Valley, 14 Aug., 1917, *Marsh 14165* (M); Payette Forest Reserve, 1912, *Mains D-70* (R. Mt.); Payette Forest Reserve, 1 Aug., 1911, *Miles 206* (R. Mt.); base of Galena Summit, Blaine Co., 12 Aug., 1916, *Macbride & Payson 3731* (G and R. Mt.).

Utah: Rush Creek, Washington Co., 4000 ft. alt., 10 July, 1899, *Jones 6486* (M); moist shady places, Peterson Cañon, Peterson, 19 July, 1902, *Pammel & Blackwood 3813* (M); near Clayton Peak, Wasatch Mts., 9000 ft. alt., 12–26 Aug., 1903, *Stokes* (M); Wasatch Mts., Big Cottonwood Canyon, Salt Lake Co., 21 Aug., 1905, *Garrett 1645* (Phil.); Alta, Aug., 1879, *Jones* (R. Mt.); Ogden, Aug., 1885, *Letterman 80* (M); Bear River Cañon, 8000 ft. alt., Aug., 1869, *Watson* (N. Y.).

Nevada: Slide Mt., Washoe Co., 7500 ft. alt., 11 July, 1910, *Heller 10203* (Stanford); Clear Creek Cañon, Ormsby Co., 5 July, 1902, *C. F. Baker 1248* (M, R. Mt., and Pomona); Rattlesnake Canyon near Lee Post Office, Elko Co., 8900 ft. alt., 25 Aug., 1908, *Heller 9564* (M).

Washington: slopes of Mt. Stuart, 2500–3500 ft. alt., 24 July, 1893, *Sandberg & Leiberg 557* (M); brooks, Nisqually Glacier, Mt. Rainier, 21 July, 1907, *Cowles 798* (M); Mt. Rainier, 6000 ft. alt., 16 Aug., 1889, *E. C. Smith* (M); Mt. Rainier, 4000–6500 ft. alt., 11 Aug., 1897, *Allen 276* (M and Stanford); Clallam, Olympic Mts., Aug., 1900, *Elmer 2572* (M and Stanford); Lake Chelan, 17 Aug., 1892, *Lake & Hull* (M and R. Mt.); Wellington, Snohomish Co., July, 1898, *Savage, Cameron & Lenacker* (M); Stevens Pass, Aug., 1893, *Sandberg & Leiberg* (M and Pomona); Yakima Region, 1882, *T. S. Brandegee 226*

(M); North Fork of Bridge Creek, Okanogan Co., Sept.,1897, *Elmer 646* (M and Pomona); Mt. Adams, 7 Aug., 1882, *Henderson 754* (Ore.); Mt. Paddo, 30 July, 1906, *Suksdorf 5779* (M and Stanford); Mt. Paddo, 31 Aug., 1882, *Suksdorf* (Phil.); The Meadows, Mt. Baker, 23 Aug., 1910, *Muenscher 965* (Cornell).

Oregon: subalpine stream banks, 4000–6000 ft. alt., eastern Oregon, 1897, *Cusick 1727* (Cornell, M, and Stanford); Bear Creek, Wallowa Co., 3800 ft. alt., 27 Aug., 1897, *Sheldon 8806* (G, U. S., M, and R. Mt.); Strawberry Lake, Strawberry Mts., Whitman Forest, Grant Co., 16 Sept., 1916, *Eggleston 13695* (M); Cherry Creek Canyon, Crater Nat. Forest, Klamath Co., 4500 ft. alt., 26 June, 1919, *Rose 1310* (M); Stanley Range, Imnaha National Forest, 7000 ft. alt., 10 Aug., 1907, *Sampson & Pearson 132* (M); Crater Lake, 30 Aug., 1916, *Heller 12620* (Cornell, Ore., and Stanford); Crater Lake, Aug., 1897, *Austin & Bruce* (Stanford); Mt. Hood, 6000 ft. alt., 9 Aug., 1914, *Jackson & Standley* (Ore.); Mt. Hood, 7000 ft. alt., 10 Aug., 1893, *Langille* (U. S.); Mt. Hood, Aug., 1886, *Howell* (Ore.); Mt. Hood, 7000 ft. alt., 25 Aug., 1899, *Barber 222* (G and R. Mt.); Oregon, *Douglas* (G).

California: Lincoln Valley, 19 July, 1901, *Kennedy 190* (R. Mt. and Stanford); Summit, Soda Springs, 10 Aug., 1901, *Kennedy 269* (R. Mt.); Lake Tahoe, July, 1897, *Blasdale* (R. Mt. and Pomona); Donner Lake, Aug., 1883, *Greene* (M); Truckee, Aug., 1890, *Sonne 262* (M); Summit, July, 1877, *Edwards 505* (M); Eldorado Co., 1866, *Rattan* (Stanford); Glen Alpine, Eldorado Co., 7000 ft. alt., 12 July, 1898, *Price* (Stanford); Heather Lake, Eldorado Co., 7900 ft. alt., 28 Aug., 1918, *Jepson 8165* (Calif.); shore of Glen Alpine stream, Eldorado Co., 12 July, 1909, *Lathrop* (Stanford); Lake of the Woods, Lake Tâhoe Region, 8 Aug., 1909, *McGregor 40* (Stanford); near Echo Camp, Eldorado Co., 6 Aug., 1915, *Heller 12155* (Cornell, M, Ore., and Stanford); ravines on Truckee River, Placer Co., 10 Aug., 1884, *Sonne* (Stanford); ridge above Donner Pass, 7500 ft. alt., 10 Aug., 1903, *Heller 7141* (M, Deam, R. Mt., Stanford, and Pomona); Bear Valley, Sierras, *Lemmon* (Stanford); Hope Valley, Alpine Co., Aug., 1892, *Hansen 471* (M and Stanford); Bear Valley, Calaveras Co., 6000 ft. alt., Aug., 1892, *Hansen 462* (M and Stanford); Big Oak Flat Road, below Crocker's, 19 July, 1918, *Ferris 1459* (Stanford); Conness Creek, Yosemite Park, 7800 ft. alt., 20 July, 1911, *Jepson 4480* (Calif.); Yosemite, 1883, *Meehan* (Phil.); Mt. Hoffman, 8500 ft. alt., July, 1901, *Evans* (Stanford and Pomona); Chilmalua Creek, Mariposa Co., 12 Aug., 1895, *Congdon* (Stanford); Matterhorn Cañon, Sierra Nevada Mts., 8800 ft. alt., 20 July, 1909, *Jepson 3367* (Calif.); above Pumice Flat, Madera Co., 22 Aug., 1918, *A. L. Grant 1567* (M); Carson Pass, 8300 ft. alt., 23 Aug., 1918, *Jepson 8111* (Calif.); region of Dinkey Creek, Fresno Co., 5300 ft. alt., 25 June–15 July, 1900, *Hall & Chandler 352* (M and Stanford); Huntington Lake, Fresno Co., 7200 ft. alt., 16 July, 1917, *A. L. Grant 1116* (M and Calif.); Daugherty Meadow, North Fork Kaweah River, 26 July, 1896, *Dudley 1430* (Stanford); vicinity of Alta Peak, Sequoia National Park, 6000–8000 ft. alt., 1 Aug., 1896, *Dudley 1553* (Stanford); Langworthy's near North Fork, Sierra National Forest, 16 July, 1912, *Abrams 4950* (Stanford); King's Canyon road west of Carson, 31 Aug., 1901, *Steinmetz* (Stanford).

M. Lewisii exhibits wide variations in the size of the leaves and in the length of the corolla-tube, but in a long series of specimens all intermediate stages may be found. *M. roseus* Dougl. is doubtless a synonym of *M. Lewisii*, though the descriptions and many of the old colored plates indicate that the pedicels were shorter than the leaves. In the specimens of Douglas at the Gray Herbarium, the pedicels are longer than the leaves whereas in the one at the New York Botanical Garden some pedicels are longer and some are shorter than the leaves. This latter specimen, together with those of *M. E. Jones 6486* from Rush Creek, Utah, *Rose 1310* from Oregon, and *Cusick 1727* from eastern Oregon, are the only ones having short pedicels that have been seen by the writer. Occasionally white or yellowish-white flowers are collected, *Merrill & Wilcox 1072*, *Macbride & Payson 3731*, *Suksdorf 5779*, and *Hansen 471* being good examples of these color forms.

53. **M. Eastwoodiae** Rydb. in Bull. Torr. Bot. Club **40**: 483. 1913; Fl. Rocky Mountains, 779. 1917.

M. cardinalis Eastw. in Proc. Calif. Acad. Sci. II. **6**: 312. 1896, not Dougl.

Plants usually densely woolly-canescent; stems terete, short, more or less procumbent, from a creeping rootstock or from short stolons; leaves broadly obovate or oblong, 2–5 cm. long, .5–2 cm. wide, acute, coarsely and saliently dentate along the upper half, tapering to a broad sessile base, the lower leaves sometimes spatulate or cuneate, frequently reddish on the lower surface; flowers few, mostly solitary; pedicels slender, usually longer than the leaves; calyx somewhat funnelform, 2.2–2.7 cm. long, teeth triangular, acute or subulate, ciliate, slightly unequal, 4–6 mm. long; corolla 3.5–4 cm. long, crimson, tube broadly funnelform, exserted less than twice its length, more or less tinged with yellow, throat ampliate, upper lip erect, lower erect or somewhat spreading, lobes nearly equal, emarginate; stamens much exserted, anthers yellow, densely bearded; style and stigma nearly as long as the corolla, stigma narrowly oblong to spatulate; capsule unknown.

Distribution: in wet, shaded places in Utah, Nevada, and Arizona.

Specimens examined:

Utah: along San Juan River, near Bluff, 3600–7000 ft. alt., 25–29 Aug., 1911, *Rydberg & Garrett 9883* (N. Y., TYPE, and R. Mt.); Springdale, 4000 ft. alt., 16 May, 1894, *Jones 5349* (U. S. and Pomona).

Arizona: abundant, but only in complete shade in wet caves or recesses under cliffs, on wet walls, Navajo Reservation, July, 1916, *Vorhies* (G, N. Y., and M); Betatakin ruin, Navajo Indian Reservation, 9 July–24 Aug., 1919, *Clute 128* (R. Mt.).

Nevada: Wheeler's Expedition, 1872, no collector given (U. S.).

This species is peculiar in producing stolons by means of which the plant propagates itself. These stolons, according to Rydberg, root freely at the nodes.

54. **M. primuloides** Benth. Scroph. Ind. 29. 1835; DC. Prodr. **10**: 372. 1846; Hook. Fl. Bor. Am. **2**: 100. 1840; Regel, Gar-

tenfl. **21**: 293, *pl. 739.* 1872; Gray in Proc. Am. Acad. **11**: 99. 1876; Bot. Calif. **1**: 569. 1876; Syn. Fl. N. Am. **2**^{1}: 279. 1878, ed. 2, and Suppl. 446. 1886; Greene in Bull. Calif. Acad. Sci. **1**: 120. 1885; Howell, Fl. Northwest Am. 552. 1901; Piper, Contr. U. S. Nat. Herb. **11**: 509. 1906; Hall in Univ. Calif. Publ. Bot. **1**: 118. 1902; Yosemite Fl. 220. 1912; Rydb. Fl. Rocky Mountains, 780. 1917; Smiley in Univ. Calif. Publ. Bot. **9**: 331. 1921. Pl. 8, fig. 3.

M. pilosellus Greene in Erythea **4**: 22. 1896; Howell, Fl. Northwest Am. 522. 1901.

M. nevadensis Gdgr. in Bull. Soc. Bot. Fr. **19**: 218. 1919.

M. primuloides var. *pilosellus* (Greene) Smiley in Univ. Calif. Publ. Bot. **9**: 332. 1921.

A variable perennial, stoloniferous, or reproducing by surface runners or by bulbils attached to the underground stems, subacaulescent with radical leaves or the stems 3–10 cm. high, bearing several pairs of leaves, internodes close together or almost as long as the leaves, glabrous or viscid-pilose with long soft hairs; leaves broadly obovate, oblong or sometimes cuneate, tapering to a narrow, somewhat connate, sessile base, 1–2.5 cm.. long, 5–7 mm. broad, light green to gray-green, thin, entire or dentate, occasionally with an undulate margin, 3–5-nerved, glabrous or with long, white, jointed hairs scattered on the upper surface; flowers few, mostly solitary, scapose, pedicels 4–10 cm. long, glabrous, slender, elongated; calyx tubular, 4–8 mm. long, weakly angled, glabrous, often tinged with red, teeth broadly triangular-acute, frequently mucronate, equal, mostly ciliate; corolla funnelform, .8–2 cm. long, yellow, sometimes with reddish-brown spots on the lobes and down the throat below the lower lip, tube exserted, less than twice as long as the calyx, throat ampliate, lobes spreading, emarginate or obcordate, the lower lip slightly longer than the upper; upper pair of stamens exserted, anthers hispid, rarely glabrous, filaments glabrous; style exserted, glabrous, stigma-lips oblong, unequal; capsule included, placentae separating at the apex; seeds oval, reticulate.

Distribution: growing in patches in moist meadows above 4000 ft. alt., from the Rocky Mountains to Washington, southward to southern California.

Specimens examined:

Idaho: mossy lake margins, Trinity Lake Region, 29 Aug., 1910, *Macbride 665* (R. Mt.); very wet meadow, Cape Horn, Custer Co., 6 Aug., 1916, *Macbride & Payson 3627* (M and R. Mt.).

Arizona: muddy places, Thompson Ranch, Bisbee, 12 July, 1900, *Goodding* (G).

Nevada: Snow Valley, Ormsby Co., 8 July, 1902, *Baker 1277* (M and Pomona); Franktown, Washoe Co., 5000 ft. alt., 28 June, 1909, *Heller 9786* (Phil. and Stanford).

Washington: Mt. Adams, 9 Aug., 1882, *Howell* (M); alpine banks, Mt. Adams, 8 Aug., 1882, *Henderson 755* (Ore.).

Oregon: swampy meadows of Summit Prairie, Blue Mts., Crook Co., 8 July, 1901, *Cusick 2649* (Cornell and R. Mt.); Ashland Butte, Siskiyou Mts., 19 July, 1887, *Howell 1243* (M and Ore.); wet meadow, Crescent, Klamath Co., 20 July, 1920, *Peck 9580* (M).

California: Shackleford Creek, Siskiyou Co., 4000 ft. alt., 9 July, 1910, *Butler 1699* (R. Mt.); along borders of mountain streams on Mt. Shasta, 6000 ft. alt., 22 Aug., 1880, *Engelmann* (M); near Sisson, 24 July–10 Aug., 1894, *Jepson 53m* (Calif.); Scott Mt., Siskiyou Co., 22 Aug., 1876, *Greene* (M); near Lassen Buttes, Plumas Co., 1–15 Aug., 1897, *H. E. Brown 603* (M); Plumas Co., 1876, *Austin* (M); Prattville, Plumas Co., 9 July, 1907, *Heller & Kennedy 8783* (M and Stanford); about Summit Station, Donner Pass, Nevada Co., 20 July, 1903, *Heller 6972* (M, R. Mt., Stanford, and Pomona); sandy flat near Yuba River, below Cisco, Placer Co., 5500 ft. alt., 25 July, 1919, *Heller 13309* (M and Cornell); Chico Meadows, Butte Co., 4000 ft. alt., 22 June, 1914, *Heller 11497* (Ore. and Stanford); Soldier's Ridge, Mendocino Co., 24 July, 1897, *Jepson 52m* (Calif.); Fallen Leaf, Eldorado Co., 21 June, 1920, *Ottley 815* (Wellesley and Cornell); Tahoe Tavern, Lake Tahoe, 15 July, 1909, *G. B. Grant 6923* (Stanford); Silver Lake, Amador Co., 8000 ft. alt., July, 1892, *Hansen 462* (M and Stanford); Summit Road near Sonora Pass, Tuolumne Co., 9000 ft. alt., 15 Aug., 1915, *A. L. Grant 291* (M, R. Mt., and Calif.); meadow near Mirror Lake, Yosemite Valley, 29 July, 1911, *Abrams 4571* (Stanford); vicinity of Tuolumne Meadows, 8500–9500 ft. alt., *Hall & Babcock 3533* (M, R. Mt., Stanford, and Pomona); near Snow Flat, Yosemite Park, 8700 ft. alt., July, 1901, *Evans* (Pomona); Mt. Lyell, 10000 ft. alt., 16 July, 1909, *Jepson 3341* (Calif.); near the Devil's Postpile, 21 Aug., 1918, *A. L. Grant 1563* (M); Jackass Meadow, Madera Co., 25 July, 1918, *A. L. Grant 1341* (Cornell, M, and Calif.); Graveyard Meadow, Fresno Co., 18 Aug., 1918, *A. L. Grant 1512a* (M); wet meadows above Mono Crossing, 5500 ft. alt., 15 Aug., 1918, *A. L. Grant 1511* (M); Pine Ridge, Fresno Co., 5400 ft. alt., 15–25 June, 1900, *Hall & Chandler 169* (M and Stanford); Nellie Lake, Fresno Co., 8400 ft. alt., 11 July, 1917, *A. L. Grant 1074* (G, M, and Ore.); Huntington Lake, Fresno Co., 7000 ft. alt., 26 July, 1917, *A. L. Grant 1177* (Cornell, M, and Calif.); Kaiser Peak, Fresno Co., 10000 ft. alt., 19 July, 1918, *A. L. Grant 1452* (M); Huckleberry Meadow between Hume and General Grant National Park, Fresno Co., 10 June, 1921, *Ottley 1448* (Cornell and Wellesley); Horse Corral Meadow, Sequoia National Forest, Fresno Co., 10 Aug., 1900, *Dudley 3168* (Stanford); near Mineral King, Sierra Nevada, 4 Aug., 1891, *Coville & Funston 1474* (Cornell and M); North Fork Crooked Creek, White Mts., 10000 ft. alt., 25 July, 1917, *Jepson 7266* (Calif.); Alta Meadow, Kern Co., 10000 ft. alt., 17 July, 1902, *G. B. Grant 1409* (Stanford); Big Meadow, Tulare Co., 7600 ft. alt., 6 Aug. 1900, *Dudley 3087* (Stanford); Kern River Valley, Tobias Meadow, Tulare Co., 10 July; 1895, *Dudley 605* (Stanford); above Kokopo Creek, region of Kaweah Peaks; Arroyo-Kern Divide, Tulare Co., 2 Aug., 1897, *Dudley 2437* (Stanford); Long Meadow, Tulare Co., 8000–9000 ft. alt., 7–14 June, 1888, *Edw. Palmer 161* (M); vicinity of Hockett Meadow, Grant National Park, 8000–9000 ft. alt., 15 July, 1897, *Dudley 1887* (Stanford); Buck Cañon Crossing, Tulare Co., 31 July, 1900, *Dudley 2942* (Stanford); Griffins, Ventura, July, 1902, *Elmer 3859* (M); Mt. Pinos, Ventura Co., 8400 ft. alt., 11 June, 1923, *Munz 7027* (Pomona); Bear Valley, San Bernardino Co., 6500 ft. alt., 24 June, 1894, *Parish 3076* (M, Calif., and Stanford); Cienega, between Bear Valley and Bluff Lake, San Bernardino Co., 30 July, 1902, *Abrams 2813* (M); San Bernardino Mountains, 6000 ft. alt., July, 1899, *H. M. Hall 1312* (M); Bluff Lake, San Bernardino Mountains, 6500 ft. alt., 21 June, 1894, *Parish 3077* (M and Stanford); Hunsaker Flats, San Bernardino Mountains, 5200 ft. alt., 8 June, 1919, *Munz, Williams & Corwin 2915* (Pomona); Round Valley, 9000 ft. alt., San Jacinto Mts., 1 Aug., 1916, *I. M. Johnston* (Pomona); Tahquitz Valley, San Jacinto Mts., 8000 ft. alt., July, 1901, *H. M. Hall 2349* (Stanford).

A beautiful perennial species suggesting the genus *Primula*, with its scapose, solitary flowers and its closely clustered basal leaves. It differs from most of the other members of this section by its habit of producing runners above ground and by its underground bulbils which appear on subterranean stems near the end of the growing season. Greene described the low, small-flowered, pilose plant as *M. pilosellus*, but in a full series of specimens every gradation in the size of the parts and in the amount and length of the pubescence may be found. Greene stated that the large and small forms hybridized and that this accounted for the numerous intermediates, but, so far, there is no evidence to support this theory.

54a. Var. **linearifolius** Grant[1]

Leaves linear to linear-oblong or sometimes spatulate, 2–4 cm. long, irregularly denticulate, obtuse or acute, glabrous or sparsely hirsutulous but not pilose; calyx 9–10 mm. long; corolla 2–2.5 cm. long.

Distribution: in the mountains in Siskiyou Co., California.

Specimens examined:

California: damp gravel bank, Shackleford Creek, 4000 ft. alt., 13 July, 1910, *Butler 1770* (M, R. Mt., and Stanford); Heather Meadow near the head of Wagon Creek Cañon, Mt. Eddy, 8500 ft. alt., 26 Aug., 1915, *Heller 12224* (G, U. S., Cornell, M, TYPE, Ore., and Stanford); Mt. Eddy, Siskiyou Co., 18 Aug., 1903, *Copeland*, distributed as *C. F. Baker 3830* (G, U. S., M,

[1] **Mimulus primuloides** Benth. var. **linearifolius** Grant, var. nov., folii lineari vel lineari-oblongi, inaequaliter denticulati, 2–4 cm. longi, glabri hirsutulosive, non pilosi; calyce 9–10 mm. longo; corolla 2–2.5 cm. longa.—Collected in Heather Meadow near the head of Wagon Creek Cañon, Mt. Eddy, Siskiyou Co., about 8500 ft. alt., 26 August, 1915, *A. A. Heller 12224* (Mo. Bot. Gard. Herb., no. 778352, TYPE).

and Pomona); meadow, foot of Mt. Eddy, 4 Aug., 1905, *Dudley* (Stanford); near Wagon Creek Falls, east side of Mt. Eddy, 29 June, 1919, *Heller* (M); Sisson, 6 July, 1914, *L. S. Smith 750* (G and U. S.).

The variety is easily separated from the species by its long, slender leaves and its larger calyx and corolla.

55. **M. bicolor** Benth. Pl. Hartw. 328. 1849; Gray in Proc. Am. Acad. **11**: 99. 1876; Bot. Calif. **1**: 568. 1876; Syn. Fl. N. Am. **2**[1]: 278. 1878, ed. 2, and Suppl. 450. 1886; Greene in Bull. Calif. Acad. Sci. **1**: 121. 1885; Eastwood, Fl. South Fork King's River, Sierra Club Publ. 27: 67. 1902; Hall, Yosemite Fl. 222. 1912. Pl. 10, fig. 4.

M. Prattenii Durand in Jour. Phila. Acad. Sci. II. **3**: 98. 1855.

Stems densely glandular-pubescent, 6–30 cm. high, simple or branched from the base; leaves few, obovate or oblanceolate or sometimes linear, 1.8–3 cm. long, 3–6 mm. broad, obtuse, yellowish-green, tapering to a slender petioled base, entire or serrulate, upper leaves sessile, internodes usually much longer than the leaves; inflorescence racemose, pedicels glandular-pubescent, mostly longer than the leaves, often spreading horizontally; calyx oblong, 6–10 mm. long, sparsely glandular-pubescent, often spotted with reddish-purple, distinctly angled, accrescent, the mature calyx campanulate, 1–1.2 cm. long, constricted at the throat and with more or less thickened, corky ribs, teeth triangular-acute, 2–3 mm. long, equal, spreading, not ciliate; corolla 1.6–2.5 cm. long, somewhat bilabiate, tube usually included, throat short, broad, funnelform, the ridges densely pubescent and spotted with red, lobes emarginate, the lower spreading, yellow, dotted with red and somewhat longer than the white upper one; stamens included, filaments slender, broad, glabrous, anthers hispid on the back; style slightly exserted, glabrous, stigma oblong with unequal, fimbriate lips; capsule oblong-linear, obtuse, placentae adherent to the apex; seeds oval, reticulate.

Distribution: common in meadows and along damp roadsides, from 2000–5000 ft. alt., throughout the Sierra Nevada Mts., California.

Specimens examined:

California: grade between Clear Creek and Paradise, Butte Co., 12 May, 1902, *Heller & Brown 5545* (Cornell, Phil., M, R. Mt., Stanford, and Pomona); abundant in moist, open places, near Forest Ranch, Butte Co., 2400 ft. alt., 17 May, 1914, *Heller 11338* (Cornell, M, Ore., and Stanford); De Sabla, Butte Co., June, 1917, *Edwards* (Stanford); near Cohasset, 28 May, 1915, *Heller 11905* (Cornell, M, Ore., and Stanford); Sacramento River, Butte Co., 1896, *Austin 163* (M); Eldorado Co., 1886, *Rattan* (Stanford); Amador Co., May, 1886, *T. S. Brandegee* (Stanford); Amador Co., May, 1886, *Curran* (Stanford); Rancheria, Amador Co., 2500 ft. alt., 9 June, 1896, *Hansen 1729* (M and Stanford); Antelope, Amador Co., 4000 ft. alt., June, 1895, *Hansen 1121* (M and Stanford); Panther Creek, Amador Co., 5000 ft. alt., May, 1895, *Hansen 1122* (M and Stanford); Big Trees, Calaveras Co., 5500 ft. alt., Aug., 1892, *Hansen 466* (M and Stanford); Big Trees, 1875, *Lemmon 1129½* (G); Avery's Station, Calaveras Co., 13 June, 1915, *A. L. Grant 3m* (Cornell and Calif.); Avery's Station, Calaveras Co., 8 June, 1917, *A. L. Grant 960* (M and Calif.); Table Mt., April, 1869, *Ames* (G); in shallow wash, Table Mt., above Rawhide, Tuolumne Co., 2000 ft. alt., 11–16 April, 1919, *Ferris 1490* (Stanford); Table Mt., near Columbia, 9 June, 1915, *A. L. Grant 2* (M and Stanford); Phoenix Lake, Tuolumne Co., 2000 ft. alt., 20 May, 1917, *A. L. Grant 950* (Wellesley and M); hills near Sonora, 12 May, 1854, *Bigelow* (G); Yosemite foothills, 1872, *Gray* (G); near Mammoth Grove, 15 May, 1854, *Bigelow* (G); Pine Ridge, Fresno Co., 5300 ft. alt., *Hall & Chandler 63* (M and Stanford); Esdeom Creek Redwoods, Kaweah River Valley Region, 23 July, 1896, *Dudley 1381* (Stanford); ridge between Pinehurst and Sequoia Lake, 3 June, 1921, *Ottley 1431* (Wellesley and Cornell); moist rocks, railroad above Alta, *Bolander* (M); valley of the San Joaquin, Aug., 1883, *Meehan* (Phil.); California, without date, *Parry* (M); California, *Hartweg 1892* (G, *type collection*).

M. bicolor is a beautiful plant, often occurring in such abundance as to color a considerable area. One patch covering over an acre was seen by the writer near Avery's Station, Calaveras

Co., in 1915. Mature specimens may readily be distinguished by the corky calyx-ribs, a character found also in *M. Bioletti.* As indicated by the name, the corolla in *M. bicolor* is usually white and yellow, but an interesting color form, in which the corolla is deep orange, occurs in many places where the typical form is found. The following collections illustrate this variation: Sugar Pine, Tuolumne Co., 3500 ft. alt., 10 June, 1917, *A. L. Grant 958* (M, G, N. Y., Calif., and Stanford); Wawona, Mariposa Co., 5000 ft. alt., 22 June, 1918, *A. L. Grant 1308* (Cornell, M, and Calif.); Snow Creek, Mariposa Co., 27 May, 1893, *Congdon* (Stanford). In the specimens of *A. L. Grant 958* from Tuolumne Co., the plants were abundant in large patches and only a few specimens of typical *M. bicolor* grew with them; in nearby places the two forms were in adjoining patches and in other places they were widely separated.

56. M. Bioletti Eastw. in Proc. Calif. Acad. Sci. III. **2**: 290. 1902.

An erect, glandular-pubescent annual; stems 5–15 cm. high, simple or branched; leaves few, oblanceolate, 1–2.5 cm. long, 2–6 mm. wide, tapering at both ends, sessile, entire or denticulate, the spatulate basal leaves usually slender-petioled; flowers numerous, pedicels erect, slightly longer than the subtending leaves; calyx oblong-campanulate, 7–8 mm. long, glandular-pubescent, often dotted with red, in fruit becoming somewhat inflated through the thickening of the ribs and 9–10 mm. long, ribs distinctly corky in mature specimens, teeth equal, triangular-acute, 2 mm. long, spreading, glandular-ciliate; corolla 1.5–2 cm. long, reddish-purple with dark red blotches down each lobe and two broad yellow patches, dotted with red, below the lower lip, tube scarcely exserted, throat broad, funnelform, hairy within, with club-shaped hairs on the ridges, lobes nearly equal, usually emarginate; stamens included, anthers yellow, hispid, filaments glabrous; style sparsely pubescent; stigma reddish-purple, peltate-funnelform, lobes unequal, fimbriate; capsule included, ovate, acute, dehiscent down both sutures, placentae adherent to the apex; seeds oval, favose-areolate.

Distribution: in wet, granite sand in the central Sierra Nevada Mts., from Tuolumne Co. to Mariposa Co., California.

Specimens examined:

California: Hetch-Hetchy Valley, June, 1900, *Bioletti* (Calif. and Calif. Acad., TYPE); abundant in wet places along the roadside, Hetch-Hetchy Valley, 10 June, 1916, *A. L. Grant 807* (G, M, and Calif.); Hog Ranch, above Hetch-Hetchy Valley, 4700 ft. alt., 14 June, 1917, *A. L. Grant 967* (G, Cornell, U. S., M, Calif., and Calif. Acad.); near the saw mill below Hog Ranch, Hetch-Hetchy Valley, 16 June, 1917, *A. L. Grant 995* (M); Hazel Green, Coulterville, Yosemite Road, 5 July, 1896, *Jepson 72m* (Calif.); Malones, Mariposa Co., 30 May, 1883, *Congdon* (G); Malones, 17 May, 1902, *Congdon* (U. S.); Hoeltzel's, Mariposa Co., 3 May, 1893, *Congdon* (Stanford); Stockton Creek, Mariposa Co., 14 June, 1903, *Congdon* (M); Snow Creek, Mariposa Co., 1 June, 1890, *Congdon* (G).

The corky ribs and more acute calyx-lobes immediately separate this species from *M. Palmeri* with which it has been confused. A number of specimens of a white form having two yellow blotches below the lower lip were collected near Hetch-Hetchy Valley by *A. L. Grant*, no. *995*. These grew in two patches with the typical form along the roadside near the saw mill below Hog Ranch, Hetch-Hetchy Valley.

57. M. Palmeri Gray in Proc. Am. Acad. **12:** 82. 1876; Syn. Fl. N. Am. **2**^{1}**:** 278. 1878, ed. 2, and Suppl. 451. 1886; Greene in Bull. Calif. Acad. Sci. **1:** 121. 1885; Hall in Univ. Calif. Publ. Bot. **1:** 117. 1902; Eastwood, Fl. South Fork King's River, Sierra Club Publ. 27: 67. 1902.

A sparingly glandular-pubescent annual, stem erect, 8–15 cm. high, simple or branched; leaves linear or oblanceolate, 1.3–1.7 cm. long, 2–4 mm. wide, entire or occasionally denticulate, the upper sessile, lower sometimes short-petioled; pedicels slender, much longer than the leaves, more or less spreading in maturity; calyx cylindrical, 7–8 mm. long, slightly angled, reddish, glabrous or minutely puberulent, slightly accrescent and not inflated, 9–10 mm. long when mature, teeth 1–1.5 mm. long, broad, obtuse, mucronate, ciliate; corolla 1.5–2 cm. long, funnelform, tube slightly exserted, throat deep reddish-purple, with a large yellow patch, streaked with red, below the lower lip or more often with 2 small oblong yellow patches, with scattered club-shaped hairs over the inner surface, lobes erect, nearly equal, rounded, erose or emarginate, reddish-purple with darker red spots at the base or sometimes pink and more or less shaded and marked with yellow; stamens included, filaments glabrous, anthers hairy; style included, stigma-lips equal, broadly rounded; capsule included, oblong, placentae separating at the apex; seeds oblong, favose-areolate.

Distribution: southern Sierra Nevada Mts. and the mountains of southern California.

Specimens examined:

California: Snow Creek, Mariposa Co., 1 June, 1890, *Congdon* (G); Fresno Co., May, 1918, *Kelley* (Cornell); near Milo, Tulare Co., 24 April, 1919, *Goetz 4* (G, N. Y., M, Stanford, Calif., and Calif. Acad.); Milo, 5 April, 1900, *Dudley* (Stanford); fields near Springfield, Tulare Co., 800–1000 ft. alt., 1897, *Purpus 5048* (U. S. and M); near Springfield on Tule River, Tulare Co., 26 March, 1897, *Dudley* (Stanford); Kaweah River Basin, 15 April, 1901, *Hopping 111* (Calif.); Little Bear Valley, San Bernardino Co., 5000 ft. alt., 14 June, 1906, *Parish 5800* (R. Mt.); San Bernardino Mts., 1881, *Parish & Parish* (G); Lytle Creek Canyon, San Antonio Mts., 5800 ft. alt., 1–3 June, 1900, *H. M. Hall 1449* (M and Stanford); Hunsaker Flats, San Bernardino Mts., 8 June, 1919, *Munz & Johnston 2856* (Pomona); San Bernardino Mts., May, 1881, *Parish & Parish 631* (Stanford); southern California, 1876, *Parry & Lemmon 308* (G, Phil., and M); Mohave River, 1 June, 1876, *Edw. Palmer 321½* (G, TYPE, Phil., U. S., and M).

58. **M. filicaulis** Wats. in Proc. Am. Acad. **26**: 125. 1891; Smiley in Univ. Calif. Publ. Bot. **9**: 335. 1921.

A glandular-puberulent annual; stem 4–8 cm. high, erect, simple, fragile; leaves few, spatulate or oblanceolate, 8–9 mm. long, thin, almost transparent, entire, nerveless, pale yellow-green, tapering to a slender base or the lower leaves short-petioled; pedicels filiform, 1–1.5 cm. long, erect, flowers mostly terminal; calyx 6 mm. long, narrowly campanulate, teeth unequal, one smaller than the others, short, triangular-acute, not ciliate; corolla 1.8–2 cm. long, rose-color, tube yellow, exserted, slender, expanding gradually to a very broad throat and nearly erect, subequal, emarginate lobes, throat yellow, spotted with reddish-purple on the lower side and with two elongated, deep yellow patches below the middle lobe, deep reddish-maroon on the upper side, these colors spreading irregularly over the lobes; stamens and style glabrous, included, anthers hispid, filaments glabrous; stigma reddish-purple, the lobes unequal; capsule not seen.

Distribution: known only from the type locality.

Specimens examined:

California: Snow Creek, Mariposa Co., 1 June, 1890, *Congdon* (G, TYPE).

No confirmation of this species has been made since the type was collected and more material may show that it is a shade form closely related to *M. Palmeri.* These specimens differ from *M. Palmeri* in having unequal non-ciliate calyx-teeth, which are triangular-acute instead of obtuse. The coloring somewhat resembles that of some of the color forms of *M. Palmeri.*

59. M. gracilipes Rob. in Proc. Am. Acad. **26:** 176. 1891.

A small glabrous or minutely puberulent annual; stem 6–15 cm. high, slender, simple or irregularly branched; leaves few, lanceolate or linear, 7–9 mm. long, 1–3 mm. wide, entire or denticulate, sessile, usually connivent at the base, basal leaves sometimes obovate; pedicels slender, spreading, 2 or more times the length of the corolla; calyx campanulate, 4–5 mm. long, reddish, not strongly angled, ribs slightly thickened, teeth equal, 1 mm. long, broadly obtuse, mucronate, ciliate; corolla 1–1.5 cm. long, rose-purple, tube yellow, included, very short, throat narrow, cylindrical, exserted, deep maroon, more or less marked with yellow, expanding abruptly to the bilabiate, almost rotately spreading limb, lobes rounded, entire, the upper lip shorter than the lower one; stamens glabrous, included; style glabrous, included, stigma-lips reddish-purple, equal; capsule oblong, obtuse, included, the placentae separating for nearly one-third their length; seeds oval, favose-areolate, slightly apiculate at each end.

Distribution: local in the foothills of Mariposa Co., California.

Specimens examined:

California: Mormon Bar, Mariposa Co., April, 1889, *Congdon* (G, TYPE, and Calif.); Bootjack Ranch, Mariposa Co., April, 1892, *Congdon* (Stanford); cliffs, Mariposa Creek, 19 April, 1903, *Congdon* (M); Mormon Bar, Mariposa Co., 3 May, 1896, *Congdon* (N. Y. and Calif.); Mormon Bar and east, April, 1888 and 1889, *Congdon* (Stanford).

60. M. androsaceus Curran ex Greene in Bull. Calif. Acad. Sci. **1**: 121. 1885; Jepson, Fl. W. Mid. Calif. 405. 1901, and ed. 2, 378. 1911.

M. Palmeri var. *androsaceus* (Curran) Gray, Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 451. 1886.

A small, nearly glabrous annual; stem 4–10 cm. high, simple or branched; leaves few, sessile, ovate-oblong, 3–5 mm. long, obtuse, entire or obscurely toothed, thick, 1-nerved, the lower leaves with a broad, somewhat cordate-clasping base; pedicels slender, reddish, spreading horizontally, the ends curved upwards, 3–4 times as long as the leaves; calyx reddish, 6–7 mm. long, lightly angled, teeth equal, short, broad, somewhat truncate, mucronate, not ciliate; corolla 8–9 mm. long, deep reddish-purple, tube narrow, included, throat short, funnelform, lobes equal, truncate, little spreading, entire; stamens glabrous, upper pair exserted; style exserted, glabrous, stigma-lips equal; capsule included, broadly ovate, placentae separating at the apex; seeds oval, favose-areolate.

Distribution: in the mountains at Tehachapi, California.

Specimens examined:

California: Tehachapi, May, 1884, *Curran* (Stanford); Tehachapi, June, 1884, *Curran* (G, Phil., Calif., and Stanford, *type collection*).

This species has been generally confused with *M. Palmeri* from which it can be distinguished by its small corolla with equal and entire lobes, its glabrous anthers, its glabrous, nearly truncate calyx-teeth with a mucronate point, and its more spreading and longer pedicels.

61. M. diffusus Grant[1] Pl. 5, fig. 1.

A low diffusely branched annual; stems 7–20 cm. long, minutely puberulent; leaves oblong, ovate or lanceolate, 1–2 cm. long, 3–7 mm. wide, irregularly dentate, sessile, the basal leaves petioled and usually rosulate; pedicels slender, minutely puberulent, 3–5 times as long as the leaves, usually spreading horizontally with the ends curved upwards in mature specimens; calyx oblong-campanulate, 5–7 mm. long, weakly angled, more or less colored with red, the ribs green, frequently tinged and tipped with red, usually thickened, especially at the base, teeth mostly glabrous, short, broadly obtuse, almost truncate, mucronate; corolla 1.3–1.7 cm. long, rose-red, tube slender, exserted, yellow, expanding gradually to the reddish-purple narrowly funnelform throat, often marked with yellow patches or spots, lobes equal, emarginate, little spreading, more or less irregularly marked with reddish-purple or yellow and with club-shaped hairs scattered over the inner surface; stamens included, anthers yellow, glabrous, filaments pubescent, slender, flattened; style pubescent, included, stigma tinged with rose-red, lips equal, rounded, fimbriate; capsule oblong, included, placentae separating at the apex; seeds oval, favose-areolate.

Distribution: arid regions of Riverside Co., and San Diego Co., California, and in Lower California.

Specimens examined:

California: Tahquitz trail near Idyllwild, San Jacinto Mts., 8 July, 1921, *Spencer 362* (Pomona Coll. Herb.); dry hillside, south of Tuscalata Creek, Riverside Co., 30 April, 1922, *Munz 5135* (Pomona); Rice Canyon, Santa Ana Mts., Riverside Co., 24 April, 1923, *Baer* (Pomona); wet sand along stream, Kenworthy, Thomas Valley, San Jacinto Mts., 4800 ft. alt., 20 May, 1922, *Munz & Johnston 5467* (Pomona); Palomar, 29 May, 1901, *Jepson & Hall 1959* (U. S., M, TYPE, and Stanford); meadow at east base of Morgan Hill, Palomar,

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[1] **Mimulus diffusus** Grant, sp. nov., annuus; caulibus 7–20 cm. longis, diffusis; foliis oblongis, ovatis lanceolatisve, 1–2 cm. longis, 3–7 mm. latis; pediculis tenuibus, foliis 3–5-plo longioribus; calyce infirme angulato tincto rubro; corolla 1.3–1.7 cm. longa, rosea; antheris glabris, filamentis pubescentibus.—Collected at Palomar, San Diego Co., 29 May, 1901, *W. L. Jepson & H. M. Hall 1959* (U. S. Nat. Herb., Mo. Bot. Gard. Herb., no. 112584, TYPE, and Stanford Univ. Herb.).

San Diego Co., 24 June, 1920, *Pierson* (Pomona); Kootka, Palomar, 17 May–1 June, 1901, *Jepson 1524* (Calif.); Elsinore, 25 April, 1892, *McClatchie 96* (Stanford); Cottonwood Creek, April, 1905, *T. S. Brandegee* (Calif.); vicinity of Santa Ysabel, 25 April, 1893, *Henshaw 100* (U. S.); Witch Creek, San Diego Co., 1 May, 1893, *Henshaw* (G); mountains near Campo, April, 1889, *Orcutt* (U. S.); Cuyamaca Mts., 1880, *Vasey 468* (U. S.); Colorado Desert, San Diego Co., April, 1889, *Orcutt* (M and U. S.).

Mexico:

Lower California: Japa, 5 July, 1884, *Orcutt* (G, N. Y., and Calif.); Guadaloupe Mt., 1 June, 1883, *Orcutt 845* (M).

M. diffusus has been distributed as *M. Palmeri* but it may be recognized by its diffuse branching habit, its long horizontally spreading pedicels, its glabrous calyx-teeth and its pubescent style.

62. M. purpureus Grant[1] Pl. 5, fig. 2.

Stem stout, 7–10 cm. high, glandular-pubescent, simple or with a few basal branches; leaves oblong or lanceolate, obtuse, 1–1.5 cm. long, 3–4 mm. wide, sessile, clasping, entire or minutely toothed, indistinctly 3–5-nerved, internodes shorter than the leaves; pedicels 3–5 times as long as the leaves, slender, erect or little spreading, glabrous; calyx glabrous, oblong, 6–7 mm. long, slightly inflated and 7–8 mm. long when mature, teeth equal, broadly obtuse or nearly truncate, mucronate, 1 mm. long; corolla 1.3–1.5 cm. long, reddish-purple, tube narrow, slightly exserted, throat short, funnel-form, lobes unequal, the upper erect, rounded and shorter than the lower spreading, emarginate ones; stamens included, anthers deep reddish-purple, glabrous, filaments pubescent; style pubescent, stigma-lobes rounded, equal, fimbriate; capsule oblong, included, dehiscent to the base along both sutures, placentae separated at the apex; seeds oval, reticulate.

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[1] **Mimulus purpureus** Grant, sp. nov., caules crassi, 7–10 cm. longi, glanduloso-pubescentes, plerumque simplices; foliis oblongis lanceolatisve, obtusis, 1–1.5 cm. longis, sessilibus, internodiis foliis brevioribus; calyce 6–7 mm. longo; corolla 1.3–1.5 cm. longa, purpureo-rubra, laciniis inaequalibus; antheris glabris, filamentis styloque pubescentibus.—Collected in Bear Valley, San Bernardino Mts., June, 1886, *S. B. & W. F. Parish 1862* (Stanford Univ. Herb. no. 74177, TYPE).

Distribution: known only from southern California.

Specimens examined:

California: Bear Valley, San Bernardino Mts., June, 1886, *Parish & Parish 1862* (Stanford, TYPE); Bear Valley, San Bernardino Mts., 6800 ft. alt., 10 June, 1922, *Munz 5651* (Pomona); Grant Creek, San Bernardino Mts., 3 June, 1901, *Parish 4903* (Stanford); dry ground near Lake, Big Bear Valley, San Bernardino Mts., 6500 ft. alt., 4 July, 1920, *Harwood 4349* (Pomona); San Jacinto, 1892, *Gregory* (Calif.).

This species has been confused with *M. Palmeri* from which it may be separated by its short leafy stems, its short internodes, and the numerous very long, erect pedicels.

62a. Var. **pauxillus** Grant[1]

Plants much smaller than the species and less branched, the stems 1–3 cm. long; pedicels mostly erect, usually longer than the rest of the plant; calyx 3–4 mm. long, campanulate, not angled, more strikingly colored red and green than in the species, teeth with a scarious margin, rarely mucronate; corolla 1–1.4 cm. long, more or less spotted and tinged with yellow, the tube very slender.

Distribution: known only from the type locality.

Specimens examined:

Mexico:

Lower California: San Pedro Martir, 15 May, 1893, *T. S. Brandegee* (G, TYPE, and U. S.).

The dwarf size of this variety and the color of the calyx distinguish it from any closely related species.

63. M. exiguus Gray in Proc. Am. Acad. **20**: 307. 1885; Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 451. 1886; Greene in Bull. Calif. Acad. Sci. **1**: 122. 1885; Conzatti & Smith, Fl. Sin. Mex. 117. 1897.

A low glabrous annual with very slender, erect, reddish stems, 3–10 cm. high, simple or more often diffusely branched; leaves few, linear or spatulate, 3–5 mm. long, 1–2 mm. broad, entire or obscurely denticulate; flowers minute, numerous, appearing from near the base; pedicels elongated, filiform, spreading, 3 to 4 times as long as the leaf; calyx campanulate, glabrous, 2 mm. long, very weakly angled, scarcely sulcate, much distended by the capsule in fruit and completely filled by it, teeth equal, ovate, acute, about one-third as long as the calyx; corolla funnelform, 3 mm. long, pink to rose-red, little exserted, lobes equal, short, erect, rounded, emarginate; stamens exserted, the upper pair almost as long as the corolla, glabrous; style and stigma exserted, glabrous, often slightly longer than the corolla, stigma deep pink, infundibuliform, lobes unequal, oblong; capsule ovate, acute, longer than the calyx, placentae separating at apex; seeds oval, apiculate at both ends, faintly reticulate.

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[1] **Mimulus purpureus var. pauxillus** Grant, var. nov., herbae minores; caulibus 1–3 cm. longis; pediculis plerumque caulibus longioribus; calyce 3–4 mm. longo, non angulato; corolla 1–1.4 cm. longa.—Collected at San Pedro Martir, Lower California, 15 May, 1893, *T. S. Brandegee* (Gray Herb., TYPE, and U. S. Nat. Herb.).

Distribution: mountains of southern California and Lower California.

Specimens examined:

California: Bear Valley, San Bernardino Mts., 6000 ft. alt., June, 1886, *Parish 1852* (Stanford).

Mexico:

Lower California: Hansen's Ranch, northern Lower California, 6000 ft. alt., 9 July, 1884, *Orcutt 1198* (G, TYPE, M, and Calif.); mountains, northern Lower California, 5 July, 1884, *Orcutt* (Calif.).

64. M. discolor Grant[1]

Dwarf glandular-pubescent plants, the simple or branched stems 3–12 cm. long, very slender; leaves in few pairs, sessile, linear or spatulate, .3–1.5 cm. long, 1–2 mm. wide, obtuse, entire; pedicels filiform, mostly longer than the leaves, often deflexed when mature; calyx campanulate, 4–9 mm. long, tinged with red or maculate, weakly angled, teeth equal or subequal, broadly deltoid, acute, 1 mm. long, margins hispid; corolla 1.2–2 cm. long, mostly yellow, more or less tinged or dotted and lined with red or occasionally deep reddish-purple, tube slender, exserted, throat ampliate, funnelform, orifice densely bearded with short club-shaped hairs, two bands of them continuing down the throat on the lower side, upper lobes rounded, usually entire, lower lobes longer, somewhat spreading, entire or emarginate; stamens included, anthers sparingly hispid, filaments pubescent; style glabrous, exserted, stigma-lips unequal, broadly rounded; capsule included, oblong, placentae tardily separating at the apex; seeds oval.

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[1] **Mimulus discolor** Grant, sp. nov., herbae annuae nanae; caule 3–12 cm. longo, glanduloso-pubescente; foliis linearibus spatulatisve, obtusis, sessilibus, integerrimis; pediculis tenuibus; calyce infirme angulato, dentibus late triangulari-acutis; corolla 1.2–2 cm. longa, plerumque flava, plus minusve rubro tincta maculosave, aliquando rubro-purpurea, tubo tenui, exserto; staminibus inclusis, antheris hispidis; stylo exserto, stigmae laciniis inaequalibus.—Collected on gravelly slopes of Pah Ute Peak, southeastern California, 7000–8000 ft. alt., April–September, 1897, *C. A. Purpus 5311* (U. S. Nat. Herb., and Mo. Bot. Gard. Herb. no. 106746, TYPE).

Distribution: open places in the Upper Transition and Canadian zones of the central Sierra Nevada Mts., California.

Specimens examined:

California: trail to Belle Meadow, Tuolumne Co., 12 July, 1915, *Jepson 6489b* (Calif.); Wawona, Mariposa Co., 4300 ft. alt., 1 July, 1911, *Jepson 4310* (Cornell); Home Camp Creek, Huntington Lake, Fresno Co., 18 July, 1918, *A. L. Grant 1421a* (Cornell); trail to Nellie Lake, Fresno Co., 8000 ft. alt., 11 July, 1917, *A. L. Grant 1080* (M and Calif.); Huntington Lake, 5 July, 1917, *A. L. Grant 1024* (Cornell, M, Calif., Stanford, and Pomona); in sandy spots, Pittman Creek above Huntington Lake, 8000 ft. alt., 27 July, 1918, *A. L. Grant 1480* (Cornell, M, and Calif.); Sequoia National Park, July, 1908, *Davidson 1975* (Davidson); General Grant National Park, 10 June, 1921, *Ottley 1455* (Cornell and M); Markwood Meadows, Pine Ridge, Fresno Co., 5900 ft. alt., 15–25 June, 1900, *Hall & Chandler 339* (M and Calif.); near Brown Meadows, Tulare Co., 7000 ft. alt., 18 June, 1904, *Hall & Chandler 5155b, 5155c* (Calif.); plateau country about Mt. Silliman, 7000 ft. alt., 3–4 July, 1900, *Jepson 717* (Calif.); gravelly slopes, Pah Ute Peak, 7000–8000 ft. alt., April-Sept., *Purpus 5311* (M, TYPE, and U. S.); Greenhorn Range, Kern Co., 6000 ft. alt., 2–10 June, 1904, *Hall & Babcock 5050* (Calif.); Kernville, 13 May, 1891, *T. S. Brandegee* (Calif.).

65. M. montioides Gray in Proc. Am. Acad. **7**: 380. 1867, mainly; Syn. Fl. N. Am. ed. 2, **2**[1]: Suppl. 450. 1886; Greene in Bull. Calif. Acad. Sci. **1**: 115. 1885; Smiley in Univ. Calif. Publ. Bot. **9**: 337. 1921.

M. rubellus var. *latiflorus* Wats. in Bot. King's Exp. 225. 1871; Gray in Bot. Calif. **1**: 568. 1876; Syn. Fl. N. Am. **2**[1]: 278. 1878, and ed. 2, 1886.

M. rubellus Gray in Proc. Am. Acad. **11**: 99. 1876, as to size of corolla; Bot. Calif. **1**: 568. 1876, as to size of corolla.

Plant glandular-pubescent or finely viscid-puberulent; stems 1–8 cm. high, simple and erect or more often branched somewhat freely from the base; leaves linear to linear-lanceolate, 1.2–2.5 cm. long, 2–6 mm. wide, sessile by a broad base, the lower leaves spatulate, lanceolate, obtuse, usually sessile, 1–3-nerved, entire; flowers mostly numerous and flowering from near the base, pedicels slender, .5–2.5 cm. long, spreading little when mature; calyx narrowly tubular, 5–6 mm. long, more or less tinged with red, teeth equal, short, usually less than 1 mm. long, broadly ovate, rounded at the apex and mucronate, ciliate; corolla 1–1.8 cm. long, yellow, often tinged or spotted with red, tube slender, exserted about one-half its length, expanding abruptly to a short, funnelform throat and spreading bilabiate limb, bearded on the lower side, limb 1–1.7 cm. in diameter, the margins rounded, often undulate; upper pair of stamens slightly longer than the throat, the filaments sparsely glandular-pubescent above, anthers glabrous; style exserted, the stigma broadly peltate-funnelform, lobes obovate, equal; capsule included, oval, compressed, acute, placentae separating for nearly half their length; seeds oval, about 1½ times as long as broad, reticulate.

Distribution: moist places in Nevada and in the high southern Sierra Nevada Mts., California.

Specimens examined:

Nevada: moist places near Carson City, March–May, 1863, *Anderson 73* (G); near Carson City, 5000 ft. alt., Apr., 1865, *Watson 790* (G); near Carson City, 1865, *Anderson* (G, N. Y., and U. S.).

California: high southern Sierras, collection of 1864, *Brewer "2785 with"* (G, TYPE, and U. S.).

66. M. deflexus Wats. in Proc. Am. Acad. **24:** 84. 1889; Coville, Contr. U. S. Nat. Herb. **4:** 171. 1893.

M. barbatus Greene in Bull. Calif. Acad. Sci. **1:** 9. 1884.

Dwarf, sparsely puberulent annuals; stem 3–8 cm. high, erect, simple or sometimes closely branched; leaves few, sessile, oblanceolate or linear, 4–17 mm. long, 1–2 mm. wide, obtuse, more or less glandular-pubescent, the basal leaves spatulate and short-petioled; pedicels filiform, at least twice as long as the leaves, often enlarged at the base and spreading horizontally in mature specimens; calyx minutely glandular-puberulent, 4 mm. long, oblong-campanulate, reddish, the ribs more or less thickened and sometimes colored red or yellow, 5 mm. long in fruit, slightly distended by the mature capsule, teeth ovate, rounded, one-fourth as long as the calyx, obtuse, mucronate, or sometimes longer and acute; corolla bilabiate, 1–1.5 cm. long, slender, tubular-funnelform, tube yellow, twice as long as the calyx, throat short and broad, with long hairs scattered over the inner surface, lobes unequal, narrow, bifid or deeply emarginate, the upper lip deep reddish-purple, erect, usually longer than the spreading lower lip, the latter yellow and more or less spotted or streaked with red or the corolla occasionally yellow streaked with red; stamens flattened, the longer pair slightly exserted, sometimes with pubescent filaments, anthers glabrous; style glabrous, yellow, exserted, stigma-lips unequal, rounded, fimbriate; capsule oblong, included, placentae separating nearly to the middle; seeds favose-areolate, about as long as broad.

Distribution: in granite sand around meadows in the high Sierra Nevada Mts., Tulare Co., California.

Specimens examined:

California: drier edges of low wet places in Long Meadow, Tulare Co., June, 1886, *Edw. Palmer 176* (G, TYPE, and M); in sandy soil around meadow, Long Meadow, Tulare Co., 14 June, 1904, *Hall & Babcock 5107* (G, M, R. Mt., Ore., Stanford, and Pomona); near Brown Meadow, Tulare Co., 7000 ft. alt., 18 June, 1904, *Hall & Babcock 5155* (G, Calif., and Stanford); Templeton Mt., near Kern Peak, 8700 ft. alt., 5 July, 1912, *Jepson 4968* (Cornell and Calif.); Rock Creek near Mt. Whitney, 9600 ft. alt., 20 July, 1912, *Jepson 5038* (Calif.); Cottonwood Creek, 10500 ft. alt., 23 July, 1912, *Jepson 5058* (M and Calif.); Cannell Meadows, southeastern Tulare Co., 7000 ft. alt., 15 June, 1904, *Hall & Babcock 5113*, *5113b* and *5113c* (Calif.); sandy places, Whitney Meadows, 9000–11000 ft. alt., Aug., 1895, *Purpus 1372* (Calif.).

A variable species, presenting interesting color forms. It is related to *M. montioides* but can be separated from that species by its general habit and by its narrow corolla-lobes which are deeply emarginate, the upper lip erect and the lower spreading.

67. **M. Breweri** (Greene) Coville, Contr. U. S. Nat. Herb. **4**: 171. 1893; Hall, Yosemite Fl. 223. 1912; Piper & Beattie, Fl. Northwest Coast, 324. 1915; Rydberg, Fl. Rocky Mountains, 780. 1917. Pl. 9, fig. 1.

Eunanus Breweri Greene in Bull. Calif. Acad. Sci. **1**: 101. 1885; Howell, Fl. Northwest Am. 519. 1903.

Mimulus rubellus Gray in Bot. Calif. **1**: 568. 1876, in part; Syn. Fl. N. Am. **2**^{1}: 278. 1878, ed. 2, and Suppl. 451. 1886, as far as the description is drawn from a "viscid puberulent" plant.

Stem 2–15 cm. high, simple or with numerous ascending branches, the whole plant glandular-puberulent or pubescent; leaves oblong or linear, 1–2 cm. long, 1–4 mm. wide, obtuse, entire or indistinctly toothed, tapering to a short, slender petiole or more often sessile, 1-nerved; flowers numerous, pedicels slender, 2–10 mm. long, usually longer than the calyx; calyx cylindrical, slightly spreading at the top, 4–8 mm. long, often reddish or spotted with red, more or less distended by the mature capsule or sometimes with ribs slightly corky when mature, teeth nearly equal or the upper tooth somewhat longer, 1–2 mm. long, broadly triangular-acute; corolla funnelform, 6–10 mm. long, pale pink to rose-red or red, glabrous externally, little exceeding the calyx, tube mostly included, throat short, with few scattered hairs, sometimes with 2 yellow lines below the lower lip, spreading slightly, the lobes subequal, entire or emarginate, often with a red spot near the base of each; stamens exserted, unequal, not approximate, glabrous; style glabrous, nearly as long as the upper pair of stamens, or occasionally included and shorter than the stamens, stigma-lips unequal, funnelform, the upper lip spatulate, rounded, the lower truncate, less than one-half as long as the upper; capsule about as long as the calyx, oblong, acute, the placentae separating at the apex but firmly adherent below; seeds about twice as long as broad, apiculate, reticulate.

Distribution: growing mostly in sandy soil along the edges of damp places or where water has been standing but has evaporated. Common from Idaho to British Columbia and down the coast into southern California.

Specimens examined:

Wyoming: Lewis River, Yellowstone Nat'l. Park, 9 Aug., 1899, *Nelson & Nelson 6371* (R. Mt.).

Idaho: damp loamy swales, Silver City, Owyhee Co., 7000 ft. alt., 15 July, 1910, *Macbride 404* (M and R. Mt.); ridges south from Wiesner's Peak, 26 July, 1895, *Leiberg 1365* (M); moist earth patch on granitic rock, Sawtooth Peaks, Blaine Co., 9 August, 1916, *Macbride & Payson 3703* (R. Mt.).

British Columbia: west of Sophie Mt., near International Boundary between Kettle and Columbia Rivers, 5000 ft. alt., 10 July, 1902, *Macoun 67855* (Cornell, M, and Pomona).

Washington: Mt. Rainier, 1906, *Carpenter 53* (M); on damp rocks, Mt. Paddo, 6000–7000 ft. alt., 28 June, 1885, *Suksdorf* (M).

Nevada: head of Fall Creek, Ormsby Co., 21 Aug., 1902, *C. F. Baker 1510* (Pomona).

Oregon: in Union Co., 1884, *Cusick* (G).

California: Shackleford Creek, Upper Campbell Lake, Siskiyou Co., 4000 ft. alt., 9 July, 1910, *Butler 1733* (R. Mt. and Stanford); northeastern Shasta Co., 4300 ft. alt., June, 1903, *Hall & Babcock 4154* (R. Mt.); 6 miles below Bartlett, McCloud River, June–Aug., 1893, *M. S. Baker* (M and Calif.); Red Clover Valley, Plumas Co., 6 July, 1907, *Heller & Kennedy 8753* (M and Stanford); Chico Meadows, Butte Co., 4000 ft. alt., 22 June, 1914, *Heller 11495* (M, Ore., and Stanford); near Donner Lake, 1865, *Torrey 373* (G); Wood's Peak, borders of the Lake, 9000–10000 ft. alt., 1863, *Brewer 2114* (G, *type collection*); Summit, Nevada Co., July, 1898, *Jepson 67m* (Calif.); Truckee, Nevada Co., July, 1893, *Sonne* (M); lower end of Donner Lake, Nevada Co., 10 July, 1903, *Heller 6893*

(M, R. Mt., Stanford, and Pomona); Donner Lake, Aug., 1883, *Greene* (G and M); Lake Valley, Lake Tahoe Region, 6400 ft. alt., 27 July, 1911, *Abrams 4780* (Stanford); Tahoe Tavern, Lake Tahoe, 6200 ft. alt., 15 July, 1906, *G. B. Grant 6946* (Stanford); Cisco, Placer Co., 5400 ft. alt., 22 June, 1910, *H. M. Hall 8704* (M, R. Mt., Stanford, and Pomona); Silver Lake, Amador Co., 8000 ft. alt., July, 1892, *Hansen 441* (M and Stanford); near Columbia, Tuolumne Co., 2000 ft. alt., 14 May, 1915, *A. L. Grant 41* (M, Calif., and Stanford); Strawberry Lake, Tuolumne Co., 5500 ft. alt., 10 June, 1917, *A. L. Grant 955* (G, M, Ore., Calif., and Pomona); McGill's, Hetch-Hetchy Valley to Lake Eleanor, Tuolumne Co., 12 July, 1894, *Burnham* (Cornell); Hog Ranch, above Hetch-Hetchy Valley, 16 June, 1917, *A. L. Grant 996* (G, N. Y., Cornell, U. S., M, and Calif.); Yosemite Falls, 5000 ft. alt., 25 June, 1911, *Jepson 4273* (Calif.); sandy soil, Yosemite, 1866, *Bolander 6311* (G); Jackass Meadow, Madera Co., 7000 ft. alt., 25 July, 1918, *A. L. Grant 1335* (Cornell, M, and Calif.); Huntington Lake, Fresno Co., 7000 ft. alt., 5 July, 1917, *A. L. Grant 1033* (G, N. Y., U. S., M, and Calif.); trail to Dinkey Grove of Big Trees, Fresno Co., 29 July, 1917, *A. L. Grant 1178* (M, N. Y., Phil., and Calif.); Rowell Meadows, Upper King's River, Fresno Co., 23 Aug., 1904, *Dudley* (Stanford); Pine Ridge, Fresno Co., 15–25 June, 1900, *Hall & Chandler 321* (M and Stanford); near Mt. Silliman, Tulare Co., 7000 ft. alt., 3–4 July, 1900, *Jepson 740* (Calif.); region of Kaweah Peaks, Kern-Kaweah Falls, Tulare Co., 10000 ft. alt., 31 July, 1897, *Dudley 2364* (Stanford); in the "Horse Pasture" near the summit of Mt. Sanhedrin, Lake Co., 20 July, 1902, *Heller 5927* (M, R. Mt., and Pomona); Webber Lake, 8 July, 1901, *Kennedy & Doten 121* (R. Mt.); moist fine-gravelly hillslopes, Trinity Summit, Humboldt Co., 7000 ft. alt., 16–23 July, 1902, *Jepson 2108* (Calif.); South Yollo Bolley Mts., 9600 ft. alt., 24 July, 1897, *Jepson 54m* (Calif.); Cottonwood Creek, Inyo Co., 10000 ft. alt., 23 July, 1912, *Jepson 5072* (Calif.); Tahquitz Valley, San Jacinto Mts., 8000 ft. alt., July, 1901, *H. M. Hall 2346* (Stanford); Bluff Lake, San Bernardino Mts., 7400 ft. alt., 20 June, 1894, *Parish 2962* (U. S. and M); San

Bernardino Co., 1876, *Parry & Lemmon 312* (G and M); north side of San Bernardino Mts., May, 1882, *Parish & Parish 1719* (M and Stanford); marshy soil, Hunsaker Flats, San Bernardino Mts., 5200 ft. alt., 8 June, 1919, *Munz & Johnston 2850* (Pomona); damp soil by creek, Fish Camp, San Bernardino Mts., 17 July, 1921, *I. M. Johnston 2900* (Pomona).

This species has been generally confused with *M. rubellus* to which it is closely related. It differs from that species, principally, in being glandular-pubescent or glandular-puberulent, in the shape of the calyx-teeth, and in the placentae being firmly adherent for most of their length. The pedicels are usually longer than the calyx, but all gradations occur from those with pedicels much shorter than the calyx to those nearly twice as long. Corky calyx-ribs are found in the specimens of *A. L. Grant 1033* from Huntington Lake, Fresno Co., California.

68. **M. Suksdorfii** Gray, Syn. Fl. N. Am. ed. 2, **2**^{1}**:** Suppl. 450. 1886; Howell, Fl. Northwest Am. 522. 1903; Rydberg, Fl. Rocky Mountains, 780. 1917.

M. montioides Gray in Proc. Am. Acad. **7:** 380. 1867, as to the form "corolla parva calyce paullo longiore."

Stems short, 2–7 cm. high, usually freely branched from the base, the plant sparsely viscid-puberulent and more or less tinged with red; leaves oblong, oblanceolate or linear, 5–12 mm. long, 1–2 mm. wide, obtuse, entire or irregularly sinuately toothed, tapering below to a sessile base or the lower sometimes petioled, flowers numerous, the pedicels slender, 5–7 mm. long, ascending; calyx cylindrical, 4–6 mm. long, reddish, teeth less than 1 mm. long, mostly equal, broadly ovate, rounded, apex sharply toothed or mucronate; corolla funnelform, 5–6 mm. long, yellow, throat barely exserted, sparsely bearded within, lobes emarginate, equal or nearly so; style and stamens glabrous, slightly longer than the throat, stigma-lips unequal; capsule barely included, oval, acute, compressed, the placentae separating about one-third of their length; seeds oval, twice as long as broad, striately ribbed.

Distribution: gravelly moist places in the high mountains from Wyoming and Idaho to Arizona, west to Washington and southern California.

Specimens examined:

Montana: Alta, 26 July, 1909, *Jones* (Pomona).

Wyoming: Swan Lake, 7400 ft. alt., June, 1885, *Tweedy 577* (Stanford); Centennial Hills, 9 June, 1895, *Nelson 1287* (R. Mt.).

Colorado: Sulphur Springs, Grand Co., 10 June, 1906, *Osterhout 3261* (G and R. Mt.); Middle Park, 1864, *Parry* (G and M).

Idaho: Shoshone, 27 May, 1899, *Trelease & Saunders 4890* (M); New Plymouth, Canyon Co., 24 April, 1911, *Macbride 775* (G and R. Mt.).

Utah: Antelope Island, 5000 ft. alt., June, 1869, *Watson 797* (G and U. S.).

Arizona: N. Arizona, 1884, *Lemmon 3270* (G).

Nevada: Eagle Valley, Ormsby Co., 7 June, 1902, *C. F. Baker 1029* (G, U. S., M, and Pomona); Peavine Mt., Washoe Co., 2 June, 1909, *Heller 9733* (Stanford); near Empire City, 1865, *Torrey 379* (G and U. S.).

Washington: on rocks, Mt. Paddo, 7000–8000 ft. alt., 29 June, 1885, *Suksdorf 487* (G, TYPE, and Calif.); on rocks, Mt. Paddo, 7000–8000 ft. alt., 12 July, 1886, *Suksdorf 893* (Phil. and M); in gravelly soil made up of sand and decomposed basalt, Grant Orchards, 1915, *Evans & Hammond* (Ore.).

Oregon: Ontario, Mathew Co., 6 May, 1898, *Leiberg 2018* (G); near camp, Dry Run, Crook Co., 28 June, 1894, *Leiberg 348* (G); basaltic hills near Harper Ranch, Mathew Co., 20 May, 1896, *Leiberg 2076* (G and U. S.).

California: between Vinton and Beckwith, Plumas Co., 2 July, 1907, *Heller & Kennedy 8688* (G and M); Chat, Lassen Co., 5000 ft. alt., 19 June, 1897, *Jones* (U. S.); Mono Pass, Sept., 1866, *Bolander 6316* (G and U. S.); North Fork Crooked Creek, White Mts., 10200 ft. alt., *Jepson 7262* (Phil., Cornell, M, and Calif.); summit of Grapevine Peak, east of Death Valley, Inyo Co., 8000 ft. alt., 12 June, 1891, *Coville & Funston 1768* (U. S.); Cottonwood Creek, Inyo Co., 10000 ft. alt., 23 July, 1912, *Jepson 5070* (Calif.); Bear Valley, San Bernardino Mts., 6000 ft. alt., June, 1886, *Parish 1851* (Stanford); Bear Valley, San Bernardino Mts., June, 1892, *Parish* (Calif.); common in low moist ground, Bear Valley, San Bernardino Mts., 10 June, 1922, *Munz 5657* (Pomona); Tahquitz Valley, San Jacinto Mts., 6 July, 1922, *Munz 5995* (Pomona).

M. Suksdorfii is a small, usually compact, much-branched annual with numerous flowers close together, differing in these characters from *M. rubellus* with which it is most easily confused. *M. rubellus* is usually a taller plant, with few branches and with larger flowers scattered along the stems. Dr. Gray separated the two species mainly on corolla characters, but these do not hold. *M. Suksdorfii* has all of the corolla-lobes notched, but *M. rubellus* varies in this respect, all of the lobes being emarginate or only those of the upper or of the lower lip. The ciliate calyx-teeth of *M. rubellus* have also been used as a distinguishing character, but this is not constant, either. The usually low, compact, bushy habit, together with the generally smaller calyx and corolla and the unequal stigma-lobes of *M. Suksdorfii*, seem to be the best way of separating the two species.

69. M. rubellus Gray ex Torr. Bot. Mex. Bound. 116. 1859; Proc. Am. Acad. **11**: 99. 1876, in part; Syn. Fl. N. Am. **2**^{1}: 278. 1878, ed. 2, and Suppl. 451. 1886, in part; Bot. Calif. **1**: 568. 1876, in part; Greene in Bull. Calif. Acad. Sci. **1**: 116. 1885; Wooton & Standley, Contr. U. S. Nat. Herb. **19**: 587. 1915; Howell, Fl. Northwest Am. 522. 1903; Nelson in Coulter & Nelson, Manual Cent. Rocky Mountains, 453. 1909; Jepson, Fl. W. Mid. Calif. 403. 1901, and ed. 2, 378. 1911; Rydberg, Fl. Rocky Mountains, 780. 1917.

M. gratioloides Rydb. in Bull. Torr. Bot. Club **28**: 27. 1901; Fl. Rocky Mountains, 780. 1917.

Stem 3–20 cm. high, erect, simple or branched from the base, the whole plant glandular-puberulent to almost glabrous, usually more or less reddish in color; leaves oblong to lanceolate or linear, obtuse, .7–1.7 cm. long, 2–5 mm. broad, narrowed to a sessile base, the lowest leaves occasionally petiolate, 1–3-nerved, the margins entire or irregularly toothed; flowers scattered, the pedicels slender, 1–2 cm. long, spreading; calyx tubular, 4–9 mm. long, 1.5–2.5 mm. broad, teeth short, rarely over 1 mm. long, usually ciliate, equal, broadly ovate, rounded, mucronate, giving the calyx a more or less truncate appearance, the ribs and often the whole calyx colored red; corolla 6–10 mm. long, red or yellow, rarely white, or the tube and throat yellow and the lobes tinged with pink, tube slender, expanding gradually to a short, somewhat exserted funnelform throat, lobes rounded, little spreading, subequal, emarginate or sometimes entire, or those of the upper lip or of the lower lip entire and the others emarginate; style and stamens glabrous and about as long as the throat, stigma-lobes equal, oblong, rounded; capsule oblong, slightly shorter than the calyx, placentae separated about one-third their length; seeds oval, twice as long as broad, striately ribbed.

Distribution: throughout the mountainous districts in the Rocky Mountain and Pacific Coast states.

Specimens examined:

Wyoming: under sage brush, Indian Creek, Carbon Co., 25 June, 1901, *Goodding 99* (R. Mt.); Swan Lake, Yellowstone Park, 7400 ft. alt., June, 1885, *Tweedy 875* (Stanford).

Colorado: Butte, 5 miles southwest of LaVeta, 22 May, 1900, *Rydberg & Vreeland 5660* (R. Mt.); Crystal Creek, 8000 ft. alt., 27 June, 1901, *C. F. Baker 253* (G, U. S., M, R. Mt., and Pomona); sage-brush flat, Naturita, 5500 ft. alt., 21 May, 1914, *Payson 331* (G, M, and R. Mt.); Gore Cañon, Grand Co., 24 June, 1907, *Osterhout 3508* (R. Mt.).

New Mexico: wet ravines, Organ Mts., April, *Bigelow* (G, TYPE); 1 mile west of Hillsboro, Sierra Co., 5500 ft. alt., 1 May, 1904, *Metcalfe 1536* (M); Organ Mts., Dona Ana Co., 16 April, 1893, *Wooton* (R. Mt.); copper mines, April, 1852, *Wright 1483* (G, Phil., and M); in the Hueco Mts., Mar., 1851, *Thurber 135* (G).

Utah: near Osmer, southern Utah, 1874, *Siler 70* (M); Milford, 10 May, 1903, *Stokes* (Calif.).

Arizona: fenced area, Santa Rita Forest Reserve, 20–23 Apr., 1903, *Griffiths 4183* (M); by streams of the Santa Catalina Mts., 19 April, 1881, *Pringle* (G and Phil.); San Francisco Mts., May–Oct., 1900, *Purpus 7069* (Calif.); Colorado River Valley, Mar., 1876, *Edw. Palmer 632* (U. S. and M); Stone Cabin Cañon, Santa Rita Mts., 4800 ft. alt., 17 April, 1903, *Thornber 378* (U. S., M, and Stanford); Ash Fork, 12 May, 1883, *Rusby 764* (U. S. and Calif.); vicinity of Flagstaff, 1 June, 1898, *MacDougal 15* (R. Mt.).

Nevada: Reno, June, 1884, *Curran* (G); dry woods, 7 miles east of Ely, 13 Aug., 1913, *Hitchcock 1256* or *1257* (U. S.); near Verdi, Washoe Co., 5300 ft. alt., 30 June, 1913, *Heller 10889* (M and Stanford); Mormon Mts., Clark Co., 24 May, 1906, *Kennedy & Goodding 86* (Stanford); Clover Mts., April, 1888, *Watson 797* (U. S.).

California: Lake Co., May, 1884, *Curran* (G); Silver Canyon in the White Mts., east of Laws, 9 May, 1906, *Heller 8210, 8212* (U. S., M, and Stanford); Surprise Cañon, Panamint Mts., 15 April, 1891, *Coville & Funston 637* (U. S.); near Mineral King, Death Valley Expedition, 7 Aug., 1891, *Coville & Funston 1524* (U. S.); north side of San Bernardino Mts., May, 1882, *Parish & Parish 1378* (Stanford); Lytle Creek Canyon, San Antonio Mts., 6000 ft. alt., 1–3 June, 1900, *H. M. Hall 1458* (M and Stanford); Smith Water Canyon, Quail Springs, Little San Bernardino Mts., 3200 ft. alt., 7 May, 1922, *Munz & Johnston 5217* (Pomona); Santa Rosa, Riverside Co., 30 June, 1922, *Munz 5911* (Pomona).

SUBGENUS II. SCHIZOPLACUS Grant

Subgenus II. SCHIZOPLACUS Grant, new subgenus

Shrubs or annuals, viscid or glandular-pubescent, pilose, or with a glutinous exudation; pedicels shorter than the calyx; corolla bilabiate or with nearly equal lobes; anthers commonly approximate in pairs forming a cross and frequently connivent, filaments glabrous or puberulent, mostly included; style glandular-pubescent on upper half or along the whole length; stigma bilamellate or peltate-funnelform, lips equal or unequal; capsule membranaceous or coriaceous, included or exserted, dehiscent along the inner suture, and part way or not at all along the outer suture, rarely indehiscent; placentae separating completely and adherent to the valves. Sect. 5–10.

SECTION 5. EUNANUS Gray

§ 5. EUNANUS Gray in Bot. Calif. **1**: 564. 1876; Proc. Am. Acad. **11**: 95. 1876; Syn. Fl. N. Am. **2**^{1}: 273. 1878, ed. 2, and Suppl. 444. 1886; Wettst. in Engl. & Prantl, Nat. Pflanzenfam. **4**^{3b}: 71. 1891.

Eunanus Benth. in DC. Prodr. **10**: 374. 1846; Watson in Bot. King's Exp. 226. 1871; Gray in Proc. Am. Acad. **7**: 381. 1876; Greene in Bull. Calif. Acad. Sci. **1**: 96. 1885, in part; Manual Bay Region, 275. 1894; Howell, Fl. Northwest Am. 518. 1901; Conzatti & Smith, Fl. Sin. Mex. 117. 1897.

Glandular or viscid-pubescent annuals; pedicels shorter than the tubular or campanulate calyx; corolla tubular-funnelform or campanulate, sometimes bilabiate, reddish-purple, occasionally pink, red, or yellow, often withering persistent, lobes nearly equal or unequal, tube less than twice the length of the calyx; style glandular-pubescent, stigma-lips equal or unequal; capsule membranaceous, separating to the base along the inner suture and about half way down the outer, occasionally opening to the base along both sutures, placentae dividing completely and adherent to the valves. Sp. 70–93.

KEY TO THE SPECIES

A. Mature calyx distinctly inflated.
a. Corolla manifestly bilabiate.
α. Calyx-throat oblique, teeth unequal.
I. Corolla-tube included.
1. Corolla-throat ventricose.
* Corolla broadly campanulate, limb 2–4 cm. wide, yellow .... *70. M. brevipes*
** Corolla-throat broad, cylindrical, limb less than 2 cm. wide, pink or deep reddish-purple .... *71. M. Bolanderi*
2. Corolla funnelform, throat not ventricose .... *72. M. Parryi*
II. Corolla-tube exserted.
1. Calyx-teeth mostly blunt .... *81. M. Torreyi*
2. Calyx-teeth triangular-acute or lanceolate.
* Plants mostly glandular-puberulent; anthers hispid.. *84. M. Austinae*
** Plants glandular-pubescent; anthers glabrous. . *86. M. angustifolius*
β. Calyx-throat slightly if at all oblique, teeth nearly equal.
I. Mature calyx tubular-campanulate; pedicels 2–3 mm. long; capsule ovate, obtuse .... *83. M. nanus*
II. Mature calyx flaring abruptly to a wide-open throat; pedicels 3–7 mm. long; capsule linear-lanceolate .... *85. M. clivicola*
b. Corolla not bilabiate, the lobes equal or nearly so.
α. Corolla little exserted, less than 1½ times as long as the calyx.
I. Capsule exserted .... *80. M. Rattani*
II. Capsule included .... *79. M. decurtatus*
β. Corolla more than 1½ times as long as the calyx.
I. Corolla-tube at least 1¾ times as long as the calyx.
1. Anthers hispid; leaves narrowly oblong or linear ...... *82. M. Layneae*
2. Anthers glabrous; leaves broadly obovate .... *73. M. spissus*

II. Corolla-tube less than 1¾ times as long as the calyx.
  1. Corolla-throat ventricose .... *78. M. subsecundus*
  2. Corolla-throat not ventricose.
    * Calyx-teeth broadly triangular, equal or nearly so . . *77. M. Fremontii*
    ** Calyx-teeth subulate, unequal.
      † Corolla mostly more than 1.5 cm. long.
        ‡ Leaves usually sessile; style slightly exserted . . *76. M. Cusickii*
        ‡‡ Leaves usually short-petioled; style included . . *74. M. Bigelovii*
      †† Corolla not more than 1.5 cm. long; stems stout, internodes long .... *75. M. Johnstonii*

B. Mature calyx little or not at all inflated, sometimes distended by the mature capsule.
  a. Corolla bilabiate, the lobes unequal .... *92. M. Jepsonii*
  b. Corolla not bilabiate, the lobes equal or nearly so.
    α. Stamens included or upper pair slightly exserted.
      I. Capsule ovate-lanceolate, usually well exserted; calyx-teeth acute, about one-fourth as long as the tube.
        1. Calyx 4–6 mm. long; leaves mostly short-petioled . . *88. M. mephiticus*
        2. Calyx 6–10 mm. long; leaves sessile .... *87. M. densus*
      II. Capsule broadly oblong or ovate, scarcely exserted; calyx-teeth lanceolate-subulate, at least one-third as long as the tube.
        1. Corolla 8–10 mm. long; anthers glabrous .... *91. M. leptaleus*
        2. Corolla more than 1 cm. long; anthers mostly hispid.
          * Corolla less than 1.5 cm. long, usually yellow, often tinged or streaked with red .... *93. M. Whitneyi*
          ** Corolla more than 1.5 cm. long, deep reddish-purple . . *89. M. coccineus*
    β. Stamens distinctly exserted .... *90. M. stamineus*

70. M. brevipes Benth. Scroph. Ind. 28. 1835; DC. Prodr. **10**:369. 1846; Hook. & Arn. Bot. Beechey's Voyage, 377. 1840; Gray in Proc. Am. Acad. **11**:97. 1876; Bot. Calif. **1**:565. 1876; Syn. Fl. N. Am. **2**^{1}: 275. 1876, ed. 2, and Suppl. 446. 1886; Bot. Mex. Bound. **2**: 116. 1859; Conzatti & Smith, Fl. Sin. Mex. 118. 1897; Abrams, Fl. Los Angeles, 365. 1904, and ed. 2, 336. 1917.

Eunanus brevipes Greene in Bull. Calif. Acad. Sci. **1**:105. 1885.

Densely viscid-pubescent annuals; stem 1–7 dm. high, simple or branched; basal leaves broadly oblong or obovate, 5–8 cm. long, 1–4 cm. broad, acute or obtuse, tapering to a slender petiole, irregularly toothed or sometimes entire, cauline leaves few, scattered, usually shorter than the internodes, sessile, narrowly lanceolate or linear, 2–6 cm. long, 2–5 mm. broad, finely toothed; pedicels 2–4 mm. long, occasionally 6–13 mm. long; calyx broadly tubular-campanulate, sometimes slightly narrowed at the oblique throat, becoming inflated in anthesis and from 8–10 mm. wide, densely glandular-pubescent on the inner and outer surfaces, teeth acute, often acuminate, very unequal, the upper reflexed, at least half as long as the tube and from 2–3 times the length of the others; corolla bilabiate, 2–5 cm. long, yellow, broadly funnelform, the tube short and narrow, expanding abruptly to a long, broad, campanulate throat, ventricose on the lower side, ridges prominent, lobes nearly equal, broad, spreading, the limb 2–4 cm. in diameter; stamens glabrous, included, they and the style and stigma yellow or occasionally green; style slender, included, stigma funnelform, lobes unequal; capsule included, ovate-oblong, acute, 1 cm. long, 4 mm. wide, somewhat coriaceous, opening at the apex and along the upper suture and splitting irregularly down the lower; seeds oblong, apiculate at both ends, papillate.

Distribution: dry sandy or rocky hillsides and mesas from Santa Barbara to northern Lower California.

Specimens examined:

California: Santa Inez Mts., Santa Barbara Co., May, 1902, *Elmer 3933* (Stanford); Sycamore Cañon, Santa Inez Mts., 13 April, 1920, *Jepson 9133* (Calif.); Santa Barbara, May, 1902, *Elmer 3933* (M); Ojai Valley, Ventura Co., 27 June, 1915, *Thacher 55* (Calif.); sandy washes and hillsides, Santa Monica Range, May, 1889, *Hasse* (M); Santa Monica Cañon, 3 July, 1893, *Barber* (R. Mt. and M); Mt. Wilson, 19 July, 1915, *Drushel* (M and Drushel); Santa Monica Mts., 800 ft. alt., 3 April, 1901, *Abrams 1279* (Stanford); open hillsides, Sepulveda Cañon, Santa Monica Mts., 700 ft. alt., 15 May, 1920, *Munz & Harwood 4006* (Pomona); dry shady rocky places, Mt. Lowe, 5000 ft. alt., *G. B. Grant 2423* (Stanford); near creek, Verdugo Cañon, near Los Angeles, 25 June, 1915, *Macbride & Payson 759* (G and R. Mt.); Echo Mt., San Gabriel Mts., 2250 ft. alt., 19 May, 1918, *Pierson 195* (M); Altadena, Los Angeles Co., 1500 ft. alt., 30 June, 1917, *F. Grinnell, Jr.* (Stanford); mountains near Claremont, 15 May, 1909, *C. F. Baker 5322* (Stanford); Coble Canyon, Claremont, 1500 ft. alt., 19 May, 1905, *Cook* (Pomona); wash at Claremont, 15 May, 1918, *I. M. Johnston* (Pomona); Ontario, 30 April, 1893, *Applegate* (Stanford); Fish Cañon, San Gabriel Mts., 6 May, 1920, *Ottley 621* (Wellesley and M); Riverside, 17 May–1 June, 1901, *Jepson 1211* (Calif.); Palomar, 17 May–1 June, 1901, *Jepson 1518* (Calif.); Menifee, Riverside Co., April, 1893, *King* (Pomona); dry mesa edge among shrubs, Red Hill, near Upland, San Bernardino Co., 28 April, 1917, *I. M. Johnston 1203* (Stanford and Pomona); dry mesas, San Bernardino Valley, 21 May, 1917, *Parish 11226* (Cornell, M, and Pomona); foothills of the San Bernardino Mts., May, 1885, *Parish & Parish 117* (M); San Bernardino Valley, 1200 ft. alt., 8 May, 1906, *Parish 5620* (R. Mt.); mouth of Icehouse Cañon, San Antonio Mts., 5000 ft. alt., 16 June, 1918, *Parish 11958* (Cornell); San Bernardino, 1100 ft. alt., 15–23 May, 1913, *Jepson 5552* (Calif.); San Bernardino Co., 1876, *Parry & Lemmon 310* (M); vicinity of San Bernardino, 1000–2500 ft. alt., 4 May, 1901, *Parish 4755* (Stanford); Santa Ysabel, 25 April, 1893, *Henshaw* (M); in Cajon Hills, 10 April, 1891, *Dunn* (Stanford); Cajon Pass, 28 May, 1914, *Jepson 6106* (Calif.); Viegas Valley, San Diego Co., June, 1877, *Cleveland* (M); on dry hills near Campo, San Diego Co., 21 May, 1903, *Abrams 3597* (Phil., M, and Stanford); slopes and benches of the south side, San Jacinto Mts., 5000 ft. alt., June, 1901, *H. M. Hall 2058* (M, Stanford, and Calif.); Arrowhead Hot Springs, San Diego Co., 23 May, 1906, *G. B. Grant 6636* (Stanford); San Luis Rey River Valley, 15 May, 1917, *Street* (Pomona); common in open fields around Hemet and San Jacinto, 30 May, 1919, *Jenkins & Street 1938* (Pomona); between the Tia Juana River and Laguna, San Diego Co., 9 June, 1894, *Mearns 3507* (Stanford); Jacumba Hot Springs, San Diego Co., 31 May, 1894, *Schoenfeldt 3347* (Stanford); Del Mar, San Diego Co., May, 1894, *Angier 33* (M); San Diego, June, 1895, *Stokes* (Stanford); Coronado Beach, San Diego, 21 April, 1895, *Fritchey* (M); among bushes, Golf Links, La Jolla, 25 April, 1914, *Clements & Clements 125* (M and Calif.); Harvey's Ranch near El Nido, San Diego Co., 20 May, 1903, *Abrams 3531* (Stanford); wayside, Palomar Mt., San Diego Co., 12 Aug., 1919, *Spencer 103* (Pomona); hills, San Diego, 4 May, 1882, *Pringle* (M); southern part of San Diego Co., 1875, *Edw. Palmer 278*

(M); Live Oak Springs, Laguna Mts., Imperial Co., 3000 ft. alt., 6 Aug., 1916, *McGregor 105* (Stanford).

Mexico:

Lower California: dry hills, northern Lower California, 22 May, 1886, *Orcutt 133* (M); Nachoguero Valley, 4 June, 1894, *Schoenfeldt 3480* (U. S.); San Telmo, northern Lower California, 17 April, 1886, *Orcutt* (Calif.).

71. **M. Bolanderi** Gray in Proc. Am. Acad. **7**: 380. 1867; Bot. Calif. **1**: 565. 1876; Syn. Fl. N. Am. **2**^{1}: 275. 1878, and ed. 2, 1886; Jepson, Fl. W. Mid. Calif. 404. 1902, and ed. 2, 377. 1911; Eastwood, Fl. South Fork King's River, Sierra Club Publ. 27: 66. 1902; Hall, Yosemite Fl. 224. 1912.

M. brevipes Gray in Pac. Rail. Rept. **4**: 120. 1856, not Benth.

Eunanus Bolanderi Greene in Bull. Calif. Acad. Sci. **1**: 105. 1885.

Densely glandular-pubescent annuals; stem erect, simple or branched, often more or less nigrescent, very viscid; leaves obovate or oblong, 2–7 cm. long, 1–2.5 cm. broad, acute, entire or sometimes denticulate along the upper part, yellow-green to dark green above, often reddish-purple below, sessile, 3–5-nerved from the base; pedicels 3–4 mm. long; calyx campanulate, 1.5–2.5 cm. long, sharply angled, glandular-pubescent on the inner surface as well as the outer, more or less constricted at the very oblique throat, 5–8 mm. wide, teeth lanceolate, unequal, the upper acuminate, recurved, at least twice the length of the others and often half as long as the tube; corolla bilabiate, 2.5–4 cm. long, pale pink to deep reddish-purple, tube pubescent externally, slender,. slightly exserted beyond the calyx-throat, abruptly expanding to a deep broad open throat, usually 1.3–1.5 cm. wide, lobes relatively short, unequal, the lower lip with two white lines running down the densely hairy ridges, these often dotted with darker red; stamens glabrous, included; style included, lobes of the stigma very unequal, the longer one lanceolate, acuminate; capsule slender, acuminate, shorter than the calyx; seeds oval, apiculate at both ends, tuberculate.

Distribution: dry open places, in the foothills of the Sierra Nevada Mts. from Calaveras Co. to Tehachapi, and in the Coast

Ranges from Mendocino Co. to Monterey Co., California. Often appearing in burned-over areas.

Specimens examined:

California: Ukiah, June, 1882, *Rattan* (G and M); Ukiah, June, 1884, *Rattan* (Stanford); near Purdy's Garden, east of Ukiah, 2500 ft. alt., 3 June–5 July, 1903, *Jepson 2247* (Calif.); in hills about Scott's Valley, northwest of Lakeport, Lake Co., 28 May–2 June, 1902, *Tracy 1747* (Calif.); West Point Bridge, Calaveras Co., 2300 ft. alt., 7 July, 1896, *Hansen 1809* (M and Stanford); Knight's Ferry on the Stanislaus River, *Bigelow* (N. Y.); burned areas in *Adenostoma* thickets, Rawhide Hill, Tuolumne Co., 1400 ft. alt., 17 May, 1919, *Williamson* (Stanford); Punch Bowl Road, near Rawhide, 13 Aug., 1915, *Stinchfield 138* (Stanford); Columbia, Tuolumne Co., 2 June, 1915, *Jepson 6352* (Cornell, M, and Calif.); Confidence, Tuolumne Co., 4000 ft. alt., 19 July, 1911, *Abrams 4726* (Stanford); beyond South Fork Bridge on road to Hetch-Hetchy Valley, 4000 ft. alt., 10 June, 1916, *A. L. Grant 809* (M and Stanford); Mariposa, 17 June, 1892, *Congdon* (Stanford); dry hillsides, Clark's Ranch, Mariposa Co., 1866, *Bolander 6314* (G, TYPE, and U. S.); roadside east of Dry Creek, Kaweah River Valley, 23 July, 1896, *Dudley 1369* (Stanford); Hites Cove, 30 May, 1883, *Congdon* (G); Tehachapi, June, 1884, *Curran* (Stanford); by Soda Springs stage road, Santa Clara Co., 3 June, 1895, *Dudley 3997* (Stanford); Tassajara Hot Springs, Monterey Co., June, 1901, *Elmer 3356* (M and Stanford); hills, upper San Antonio Creek, Santa Lucia Mts., 14–20 June, 1901, *Jepson 1656* (Calif.).

This is an interesting species related to *M. Rattani* in its northern limit and to *M. subsecundus* in its southernmost stations. It grows in dry open places in the Sierra Nevada Mts., where it frequently appears in great abundance following chaparral fires. It is extremely viscid, so much so that according to Rattan "house flies are captured when they alight on its stem." It has a strong odor of *Nicotiana* and is often called "Wild Tobacco."

71a. Var. brachydontus Grant[1]

Leaves smaller, oblong to oblanceolate, 1.5–3.5 cm. long; calyx 1–1.5 cm. long, 4–6 mm. wide, throat very oblique, teeth broadly triangular-acute, about equal in length or more often with the upper tooth somewhat longer and straight or slightly curved; corolla 1.7–2 cm. long, the lips shorter and more nearly equal than in the species.

Distribution: dry open places from the Coast Ranges in northern California, south to Lake Co., Sierra Nevada Mts., from Colusa Co. to Fresno Co., California.

Specimens examined:

California: west of Bennett Spring on the Newville-Covelo Road, Glenn Co., 3000 ft. alt., 16 June, 1915, *Heller 11992* (M and Stanford); open gravelly places, between Mud Flat and Bennett Spring, 2500 ft. alt., 3 June, 1915, *Heller 11927* (M and Stanford); Bruno Valley, Lake Co., May, 1902, *Bowman 219* (Stanford); Hough's Springs, north Lake Co., 24 May, 1920, *Jepson 9054* (Calif.); Uncle Sam Mt., Lake Co., July–Aug., 1892, *Jepson 22m* (Calif.); Colusa Co., June, 1884, *Rattan* (Stanford); Hetch-Hetchy Valley, 3660 ft. alt., 15 June, 1918, *A. L. Grant 1264* (G, Phil., U. S., Cornell, M, TYPE, Calif., and Stanford); Mariposa, 14 May, 1882, *Congdon* (G); Aqua Fria, Mariposa Co., 19 May, 1895, *Congdon* (Stanford); Alder Creek Trail, Yosemite Park, 4500 ft. alt., 1 July, 1911, *Jepson 4314* (Calif.); Grant's Springs, Mariposa Co., 30 June, 1896, *Congdon* (Calif.); Raymond, 9 June, 1894, *Burnham* (Cornell); road from Raymond to Yosemite, 11 June, 1891, *Fritchey 1* (M); Mariposa Big Tree Grove, July, 1878, *Lemmon* (M); dry, open hillsides between Cascada and Huntington Lake, Fresno Co., 6500 ft. alt., 25 June, 1917, *A. L. Grant 1005* (Cornell and M); above Cascada, Fresno Co., 5500 ft. alt., 6 July, 1917, *A. L. Grant 1065* (M); Squaw Valley to

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[1] **Mimulus Bolanderi** Gray var. **brachydontus** Grant, var. nov., folii parviores, oblongi oblanceolative, 1.5–3.5 cm. longi; calyce 1–1.5 cm. longo, 4–6 mm. lato, fauce obliquo, dentibus late triangulari-acutis, superiore dente valde longiore; corolla 1.7–2 cm. longa, laciniis brevioribus, fere aequalibus.—Collected in Hetch-Hetchy Valley, Tuolumne Co., California, 3660 ft. alt., 15 June, 1918, *Adele Lewis Grant 1264* (Gray Herb., Phil. Acad. Nat. Sci. Herb., Cornell Univ. Herb., Mo. Bot. Gard. Herb., no. 893308, TYPE, Univ. Calif. Herb., and Stanford Univ. Herb.).

Dunlap, Fresno Co., 17 May, 1907, *Jepson 2751* (Calif.); Sierra Nevada, without date, *Anderson* (G).

The variety seems, at first, to be distinct, based on differences in size, width of throat, length of calyx-teeth in relation to each other, and the amount of curvature of the longer calyx-tooth. A careful examination of a number of specimens, however, shows that these differences are not constant. In some, the teeth are of nearly the same length and straight, while in others the upper tooth is distinctly longer, though not always recurved. The specimens of T. S. Brandegee from Snow Mt. have yellow corollas, according to a note on the label.

72. **M. Parryi** Gray in Proc. Am. Acad. **11**: 97. 1876; Bot. Calif. **1**: 565. 1876; Syn. Fl. N. Am. **2**^{1}: 275. 1878, and ed. 2, 1886.

Eunanus Parryi Greene in Bull. Calif. Acad. Sci. **1**: 104. 1885; Rydb. Fl. Rocky Mountains, 781. 1917.

Small glandular-puberulent annuals; stem simple or with a few short branches, flowering freely from near the base; leaves oblong to lanceolate, 1–2 cm. long, 2–4 mm. wide, entire, nearly glabrous, tapering to a slender base; pedicels 2–3 mm. long; calyx campanulate, 8–10 mm. long, 3–4 mm. wide when mature, glandular-puberulent, scarious below the sinuses, throat very oblique, not constricted, teeth broadly triangular, acute, the upper tooth twice as long as the lateral ones, the latter tending to become subulate; corolla bilabiate, funnelform, 1.5–2 cm. long, yellow, sometimes tinged with reddish-purple, tube short, included, throat glabrous or puberulent externally, less than twice as long as the calyx, lobes broad, rounded, widely spreading; stamens glabrous, unequally inserted, longer pair with broad filaments, the shorter with slender filaments, anthers small; style sparsely puberulent, stigma-lobes nearly equal, bilamellate; capsule slightly longer than the calyx-tube, lanceolate, obtuse; seeds apiculate at each end, tuberculate.

Distribution: southern Utah.

Specimens examined:

Utah: abundant on gravelly hills near St. George, April, 1874, *Parry 147* (G, TYPE, and M); St. George, Mokiah Pass, southern

Utah, 1877, *Edw. Palmer 383* (G and M); St. George, 13 April, 1880, *Jones 1655* (Pomona); Diamond Valley, 4500 ft. alt., 28 April, 1894, *Jones* (Pomona).

73. **M. spissus** Grant[1] Pl. 7.

A stout, much branched, glandular-villous annual; stem 15 cm. high; flowers and leaves densely crowded toward the ends of the branches; leaves broadly obovate, 1–1.5 cm. long, 4–6 mm. broad, acute or cuspidate, entire, 3–5-nerved from the base, villous, tapering to a short slender petiole; pedicels 1–2 mm. long; mature calyx broadly campanulate, much inflated, 8–9 mm. long, scarious between the green ribs, teeth unequal, lanceolate-subulate, the three upper longer and broader than the others, nearly half as long as the calyx; corolla funnelform, 1.5–1.8 cm. long, pink, more or less tinged and streaked with red, tube much exserted, throat broad, with two densely yellowish hairy patches below the lower lip, lobes nearly equal; stamens glabrous, included in the tube; style included; stigma-lips unequal, broadly rounded, ciliate; capsule lanceolate, arcuate; seeds smooth, at least twice as long as broad.

Distribution: known only from the type locality.

Specimens examined:

Nevada: Silver Peak Mts., 5000 ft. alt., 29 Sept., 1915, *Goldman 2548* (U. S., TYPE).

74. **M. Bigelovii** Gray in Proc. Am. Acad. **11**: 96. 1876; Bot. Calif. **1**: 564. 1876; Syn. Fl. N. Am. **2**^{1}: 274. 1878, ed. 2, and Suppl. 444. 1886; Abrams, Fl. Los Angeles, 365. 1904, and ed. 2, 335. 1917.

Eunanus Bigelovii Gray in Pac. Rail. Rept. **4**: 121. 1856; Watson, Bot. King's Exp. 226. 1871; Greene in Bull. Calif. Acad. Sci. **1**: 102. 1885; Howell, Fl. Northwest Am. 518. 1903; Rydb. Fl. Rocky Mountains, 780. 1917.

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[1] **Mimulus spissus** Grant, sp. nov., annuus, crassus, multo ramosus glanduloso-villosus; caule 15 cm. alto; foliis floribusque dense spissis ad terminos ramorum; foliis late obovatis, acutis cuspidatisve, villosis; fructifero calyce multo inflato, 8–9 mm. longo, dentibus inaequalibus, lanceolatis, subulatis, tribus proximis alteris longioribus latioribusque et fere calycis dimidiis; corolla 1.5–1.8 cm. longa, pallida rosea plus minusve rubro-colorata.—Collected on Silver Peak Mts., 5000 ft. alt., 29 Sept., 1915, *E. A. Goldman 2548* (U. S. Nat. Herb. no. 767707, TYPE).

Stem simple or more often branched, 5–25 cm. high, glandular-pubescent, frequently tawny viscid-villous on the calyx and lower surface of the leaves; leaves thin, scattered, broadly obovate or elliptical, 1.5–3.5 cm. long, 5–12 mm. broad, acute, entire or occasionally minutely toothed toward the apex, mostly 1-nerved, tapering to a slender petiole or the upper leaves often subsessile; flowers usually clustered at the tips of the stem and branches, pedicels 1.5–3 mm. long; calyx broadly oblong, 8–12 mm. long, throat more or less oblique, teeth sharply subulate from a broad base, unequal, the lower teeth smaller, about one-third as long as the tube; corolla reddish-purple, 1.5–3 cm. long, tube mostly included, throat narrowly funnelform, often with a large yellow patch extending down the yellow tube, and expanding abruptly to a broad spreading almost rotate limb, 1.5–2 cm. wide, the lobes subequal with rounded sinuses; stamens included in the lower part of the throat, anthers usually somewhat hispid; style included, stigma-lobes broadly peltate-funnelform, equal, capsule slender, lanceolate, tapering to a narrow blunt apex, often incurved, rarely longer than the uppermost calyx-tooth; seeds oblong, rounded at both ends, papillate.

Distribution: western Nevada, Arizona, and throughout the arid regions of California from Tulare Co. to Imperial Co.

Specimens examined:

Arizona: Zucca, 21 May, 1884, *Jones* (Pomona).

Nevada: log railroad north of Verdi, Washoe Co., 5300 ft. alt., 30 June, 1913, *Heller 10890* (Stanford); Eldorado Cañon at Nelson, 3000 ft. alt., 30 April, 1907, *Jones* (Pomona).

California: Water Canyon, Tehachapi Mts., Kern Co., 6500 ft. alt., 26 June, 1908, *Abrams & McGregor 464* (Stanford); summit, Mt. Wilson, 15 June, 1906, *G. B. Grant 6688* (Cornell, M, and Stanford); Wilson's Peak, Los Angeles Co., 10 July, 1901, *Abrams 1892* (Stanford); summit of Mt. Wilson, Los Angeles Co., 30 June, 1902, *Abrams 2588* (G and M); King's Cañon, Liebre Mts., Los Angeles Co., 7 June, 1896, *Dudley & Lamb 4359* (Stanford); hill above Cuddy's, Cuddy Canyon, Mt. Pinos region, 15 June, 1896, *Dudley & Lamb 4504* (Stanford and Pomona); Swarthout Cañon, San Antonio Mts., June, 1887, *Parish 1982* (Calif.); sandy wash, 11 miles west of

Needles, 31 March, 1920, *Munz 3613* (M and Pomona); The Needles, 8 May, 1884, *Jones 3860* (R. Mt. and Pomona); Thermal, 3 May, 1903, *Davidson 1108* (Davidson); foothills west of Bishop, Inyo Co., 18 May, 1906, *Heller 8279* (M and Stanford); Andrews' Camp, Bishop Creek, Inyo Co., July, 1911, *Davidson 2697* (Davidson); Cushenberry Cañon,. San Bernardino Co., 15 June, 1895, *Parish* (Stanford); Lone Willow Spring, Mohave Desert, San Bernardino Co., 8 May, 1915, *Parish 10119* (Stanford); hillside, Copper City, Mohave Desert, 13 May, 1922, *I. M. Johnston 5590* (Pomona); Fort Mojave, ravines in gravel, 6 Feb., 1860–61, *Cooper* (G); Ord Mts., near Kane Spring, Mohave Desert, 4200 ft. alt., 1 May, 1906, *Hall & Chandler 6790* (R. Mt. and Pomona); Ord Mts., Mohave Desert, 2 May, 1914, *Jepson 5862* (Calif.); Stoddard's Well, Mohave Desert, 9 May, 1914, *Jepson 5911* (Calif.); Mohave Creek near the Colorado, 2 Mar., 1854, *Bigelow*, in Whipple's Exp. (G, TYPE, and N. Y.); gravelly hills near the Colorado of California, 17 Feb., 1854, *Bigelow* (G); Cottonwood Springs, Colorado Desert, Riverside Co., 2200 ft. alt., May, 1905, *H. M. Hall 6011* (Stanford); Borrego Valley, western Colorado Desert, San Diego Co., 26 April, 1920, *Jepson 8797* (Cornell and Calif.); Vallecito, western Colorado Desert, 15 April, 1920, *Jepson 8580* (Cornell, M, and Calif.); southwestern part, Colorado Desert, April, 1889, *C. R. Orcutt* (M and Stanford); San Felipe Canyon, Colorado Desert, 13 April, 1913, *Eastwood 1738a* (G); Morongo, borders of the Colorado Desert, April, 1882, *Parish 1217* (M); Hananpah Cañon, Panamint Mt., 4000 ft. alt., 7 May, 1917, *Jepson 6956* (Calif.); between Coyote Wells and Cement Bridge, Imperial Co., 1 April, 1917, *McGregor 837* (Stanford); Aqua Caliente, April, 1884, *Parish & Parish* (G and Stanford); Vallecito, San Diego Co., 17 April, 1920, *Jepson 8945* (Calif.).

74a. Var. **cuspidatus** Grant[1]

Plants stouter, branching more freely and regularly, densely viscid-villous; leaves thick, broadly obovate or rhomboid, mostly abruptly cuspidate, 3–5-nerved, tapering to a slender short-petioled base; pedicels 3–8 mm. long, usually longer than in the species; corolla smaller, 1–2 cm. long; stamens glabrous; stigma-lobes unequal; capsule arcuate, often exceeding the calyx.

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[1] **Mimulus Bigelovii** Gray var. **cuspidatus** Grant, var. nov., herba crassior, libere ramosa, dense viscido-villosa; foliis spissis, late obovatis rhomboidibusve, fere cuspidatis, 3–5-nervatis; corolla parviore, 1–2 cm. longa; staminibus glabris.—

Distribution: arid region of western Nevada and central California.

Specimens examined:

Nevada: Steamboat Springs, Washoe Co., 9 Aug., 1906, *Kennedy 1487* (Stanford); 10 miles below Mica Springs, 2000 ft. alt., 13 April, 1894, *Jones 5054* (M, TYPE, U. S., R. Mt., and Pomona); Rhyolite, Tonopah, 3600 ft. alt., 1 June, 1907, *Shockley 50* (Stanford); Panaca, 6 Sept., 1912, *Jones* (Calif., Stanford, and Pomona); Bennett Spring, Highland Range, May–Oct., 1898, *Purpus 6304a* (Calif.); Pahroc Spring, 3000–4000 ft. alt., Aug., 1898, *Purpus 6304* (Calif.).

California: Furnace Creek, Death Valley, 2300 ft. alt., *Jepson 6888* (Calif.); rocky slopes of Argus Mts., 3000–4000 ft. alt., Apr.–Sept., 1897, *Purpus 5348a* (M); Ibex Spring, Inyo Co., 22 May, 1915, *Parish 10039* (Calif. and Stanford); Toll House near Big Pine, Inyo Co., 1898, *Purpus 5786* (Calif.); Silver Canyon in the White Mts., east of Laws, Inyo Co., 7 May, 1906, *Heller 8194* (M and Stanford); dry hills, Barstow, Mohave Desert, 29 May, 1914, *Parish 9242* (Cornell and M); Morongo, April, 1882, *Parish & Parish* (M).

75. **M. Johnstonii** Grant[1]

Stem stout, erect, branches few, irregular, appearing from the base to half way up the stem, glandular-pubescent; leaves broadly obovate to rhomboid, 1.5–2 cm. long, 4–10 mm. broad, acute,

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Collected 10 miles below Mica Springs, 2000 ft. alt., 13 April, 1894, *Marcus E. Jones 5054* (U. S. Nat. Herb., Mo. Bot. Gard. Herb., no. 106688, TYPE, and Rocky Mt. Herb.).

[1] **Mimulus Johnstonii** Grant, sp. nov., caulis crassus, rami pauci, glanduloso-pubescentes; foliis late obovatis rhomboidibusve, 1.5–2 cm. longis, 4–10 mm. latis; calyce late campanulato, 8–10 mm. longo, inflato et infirme angulato, dentibus deltoidibus, acuminatis, inaequalibus; corolla rosea, laciniis brevibus, limbo 1–2 cm. lato; capsula lanceolata, obtusa.—Collected under pines, San Antonio Cañon, San Antonio Mts., Los Angeles Co., 6000 ft. alt., 28 July, 1917, *Ivan M. Johnston 1562* (Gray Herb., Mo. Bot. Gard. Herb. no. 893569, TYPE, Stanford Univ. Herb., and Pomona Coll. Herb.).

tapering to a short broad petiole, thick, 1–3-nerved from the base; flowers axillary, flowering from near the base and usually closely clustered at the tips of the branches, pedicels slender, 3–6 mm. long; calyx broadly campanulate, 8–10 mm. long, inflated and weakly angled when mature, membranous, the teeth herbaceous, broadly deltoid, sharply acuminate, unequal, the upper tooth longer and recurved, throat expanded, oblique; corolla funnelform, 1.3–1.5 cm. long, rose-red, more or less shaded and streaked with darker red, tube included, throat short with a large hairy yellow patch on the lower side, lobes short, rounded, subequal, the limb 1–2 cm. in diameter; stamens glabrous, the upper pair and the style usually exserted; stigma-lips equal, ciliate; capsule lanceolate, obtuse, slightly incurved at the apex, about as long as the uppermost calyx-tooth; seeds oval, smooth, apiculate at each end, about 1 mm. long.

Distribution: known only from the San Antonio Mts. in southern California. Common on dry ground under the pines in the Canadian Zone.

Specimens examined:

California: under pines, San Antonio Cañon, San Antonio Mts., Los Angeles Co., 6000 ft. alt., 28 July, 1917, *I. M. Johnston 1562* (G, M, TYPE, Stanford, and Pomona); common under pines, Baldy Lookout of U. S. Forest Service, San Antonio Mts., 7000 ft. alt., 20 June, 1917, *I. M. Johnston 1486* (Stanford and Pomona); Cucamonga Mts., San Bernardino Co., 5000 ft. alt., July, 1920, *Childs* (M).

Its stout stems, long internodes, small flowers, and usually slightly exserted style and stamens will serve to separate this species from *M. Bigelovii*, with which it has been confused. The seeds are interesting in that they are fully twice as large as those of any of the other species in this section except *M. Cusickii*. The specific identity of these plants was first questioned by I. M. Johnston in his paper "The Flora of the Pine Belt of the San Antonio Mountains of Southern California" (Plant World **22**: 116. 1919).

76. **M. Cusickii** (Greene) Piper, Contr. U. S. Nat. Herb. **11**: 508. 1906.

M. Bigelovii var. *ovatus* Gray, Syn. Fl. N. Am. ed. 2, 2^1: Suppl. 445. 1886.

Eunanus Cusickii Greene, Pittonia **1**: 36. 1887; Howell, Fl. Northwest Am. 518. 1903.

More or less glandular-pubescent plants; stem stout, erect, simple or branched, 1–4 dm. high; leaves ovate, 1–3.5 cm. long, 1.8–2 cm. wide, acute or cuspidate, mostly distinctly 3-nerved at the broad base, upper leaves closely sessile, lower sometimes tapering to a short broad petiole; flowers scattered along the axis and in more or less close clusters at the tips of the stems, pedicels 1–2 mm. long; calyx ovate-campanulate, 1.2–1.5 cm. long, usually somewhat constricted at the oblique throat, teeth broad at the base, becoming abruptly subulate, unequal; corolla funnelform, 2–3 cm. long, reddish-purple, tube yellowish, exserted, expanding gradually to a wide open throat, densely bearded and with one or two large yellow patches or streaks spotted with red below the lower lip, lobes nearly equal, rotately spreading, broad with rounded sinuses, 1.5–2.5 cm. wide; stamens included, filaments of the longer pair glandular-pubescent, anthers hispid; style slightly exserted, densely pubescent, stigma-lips rounded, subequal, ciliate; capsule lanceolate, obtuse, more or less incurved, exserted; seeds oval, apiculate at each end, smooth.

Distribution: sandy or rocky places in western Idaho, Nevada, and Oregon.

Specimens examined:

Idaho: in the lava, Murphy, Owyhee Co., 4 July, 1911, *Nelson & Macbride 1032* (R. Mt.).

Nevada: Lake Washoe, 1865, *Torrey 372* (G, type of *M. Bigelovii* var. *ovatus* Gray).

Oregon: steep sandy hillsides of Crook Co., 2 July, 1901, *Cusick 2630* (Cornell, M, and R. Mt.); sands of the Walker Basin, Crook Co., 1 Sept., 1902, *Cusick 3009* (Cornell, M, and Stanford); stony hillsides of Ochoco, in great abundance, 3 Sept., 1902, *Cusick 2997* (Cornell, M, and Stanford); hillsides of Cottonwood Creek, near the Malheur, 20 June, 1898, *Cusick 1951* (G, Cornell, and M); Malheur River, eastern Oregon, 1885, *Cusick 1262* (G); Mitchell, Aug., 1893, *Wilson* (Stanford); Muddy Station, John Day Valley, 12 May, 1885, *Howell* (G, Phil., and Ore.); sands of the desert near Squaw Creek, Crook Co., 13 June, 1902, *Cusick 2810* (G, Cornell, and M); yellow pine forest, 1 mile west of Sister's, Crook Co., 27 June, 1919, *Ferris & Duthie 560* (Stanford); mts. of Oregon, 1875, *Nevins* (G); John Day River, 22 Sept., 1896, *Cole* (Ore.).

This species can be separated from *M. Bigelovii*, with which Dr. Gray originally confused it, by its stouter, longer and more erect stems, and by its larger leaves which usually are broadly ovate, subulate, 3-nerved at the base and closely sessile. The strongly oblique calyx-throat and the densely glandular-pubescent exserted style further help to distinguish it.

77. **M. Fremontii** (Benth.) Gray in Proc. Am. Acad. **11**: 96. 1876; Bot. Calif. **1**: 565. 1876; Syn. Fl. N. Am. **2**^{1}: 275. 1878, ed. 2, and Suppl. 445. 1886; Conzatti & Smith, Fl. Sin. Mex. 118. 1897; Abrams, Fl. Los Angeles, 365, 1904, and ed. 2, 335. 1917.

Eunanus Fremontii Benth. DC. Prodr. **10**: 374. 1846; Greene in Bull. Calif. Acad. Sci. **1**: 103. 1885; Wats. Bot. King's Exp. 226. 1871.

Stem red, 4–20 cm. high, usually freely branched from near the base, more or less villous with white shaggy hairs, viscid or glandular-pubescent, or occasionally nearly glabrous; leaves oblong, oblanceolate, or spatulate, 1–3 cm. long, 2–8 mm. wide, tapering to a slender sessile base, often irregularly toothed along the upper part, lower leaves commonly broadly obovate, petioled and more or less tinged with red; flowers numerous on short pedicels, 1–2 mm. long and often crowded toward the tips of the stems; calyx broadly campanulate, 8–10 mm. long, somewhat enlarged when mature, constricted slightly at the oblique throat, teeth broadly triangular, acute or obtuse, 2 mm. long, nearly equal; corolla broadly funnelform, 2–2.5 cm. long, rose-red with darker markings down the throat, the proper tube mostly included, throat with two yellow ridges more or less spotted with red down the lower side, fully as long as the calyx, expanding to a broad, spreading limb, 1.3–1.8 cm. in diameter, lobes rounded, somewhat unequal; stamens short, included in the lower half of the throat, glabrous, or the filaments of the longer pair short, glandular-pubescent; style sparsely glandular-pubescent, the stigma-lobes nearly equal, peltate-funnelform; capsule lanceolate, attenuate, often arcuate, about as long as the calyx; seeds oblong, reticulate, apiculate at both ends.

Distribution: dry sandy open places in the interior of California, southward into Lower California; especially common in the desert regions. Possesses a strong mephitic odor.

Specimens examined:

California: grassy western slopes of Big Pinnacles, Monterey Co., 27 April, 1919, *Ferris 1729* (Stanford); mountain sides near falls above New Idria, Monterey Co., 31 May, 1899, *Dudley* (Stanford); Priest Valley to New Idria, San Carlos Range, 12 May, 1907, *Jepson 2680* (Calif.); Mt. Diablo, April, 1878, *Lemmon* (M); Paso Robles, San Luis Obispo Co., 23 April, 1899, *Barber* (Calif.); Tehachapi, Kern Co., 5 May, 1905, *Heller* (Calif.); Mono Flat, Santa Barbara Co., 18 May, 1907, *H. M. Hall 7791* (R. Mt., Calif., and Pomona); Topatopa Mts., Ventura Co., 6000 ft. alt., 4–6 June, 1908, *Abrams & McGregor 99* (U. S., Stanford, and Pomona); Seymour Creek, Mt. Pinos, Ventura Co., 10 June, 1923, *Munz 7005* (Pomona); San Dimas Wash near Claremont, 27 April, 1902, *Bixby* (Pomona); Big Tunga Wash, Los Angeles Co., 6 April, 1901, *Abrams 1379* (Stanford and Pomona); Glendora, Los Angeles Co., 7 May, 1904, *G. B. Grant 6203* (Phil., M, Calif., Stanford, and Pomona); Colton, 27 April, 1882, *Jones 3188* (M); exposed south slopes in the vicinity of Chalk Hill, San Jacinto Mts., 5000 ft. alt., June, 1901, *H. M. Hall 2049* (Stanford and Pomona); Oro Grande Wash, west of Hesperia, 17 May, 1920, *I. M. Johnston 2312* (Pomona); dry mesas, San Bernardino Valley, 21 May, 1917, *Parish 11225* (Cornell and Pomona); sandy banks of the Mohave River, San Bernardino Co., 3500 ft. alt., 29 May, 1901, *Parish 4904* (U. S. and Stanford); hillsides, San Jacinto Cañon, 17 May–1 June, 1901, *Jepson & Hall 1293* (Calif.); Idyllwild, San Jacinto Mts., 5300 ft. alt., 16 June, 1921, *Spencer* (Pomona); sandy plains, Highlands, San Bernardino Co., May, 1888, *Parish* (Calif.); dry mesas, San Bernardino Valley, 12 June, 1918, *Parish 11912* (M); Swarthout Canyon, San Antonio Mts., 6000 ft. alt., 3–6 June, 1900, *H. M. Hall 1543* (M); San Bernardino Valley, 1000 ft. alt., 8 May, 1906, *Parish 5619* (R. Mt.); vicinity of San Bernardino, 1000–2500 ft. alt., 18 May, 1901, *Parish 4791* (Stanford); Edgar Cañon, San Bernardino Mts., 2500 ft. alt., 13 June, 1894, *Parish 3016* (M and Stanford); Mentone, San Bernardino Co., May, 1903, *R. J. Smith* (Phil., M, and R. Mt.); San Bernardino Co., 1876, *Parry & Lemmon 309* (M); Mill Creek Cañon, San Bernardino Co., 4000 ft. alt., 20 June, 1901, *Parish 5094* (Stanford); San Bernardino Valley, May, 1913, *Jepson 5581* (Calif.); Temescal Wash, southern California, 17 May–1 June, 1901, *Jepson 1573* (Calif.); Cuyamaca Mt., June, 1880, *Parish 465* (Stanford); Buckman Springs, 3000 ft. alt., May, 1893, *Stokes* (Stanford); in dry washes, Campo, San Diego Co., 25 May, 1903, *Abrams 3596* (Stanford); San Felipe, San Diego Co., 16 April, 1895, *T. S. Brandegee* (Calif.); San Ysabel, San Diego Co., 4 May, 1893, *Henshaw* (M); San Diego, April, 1882, *Jones* (R. Mt.); Hesperia, April, 1892, *Trelease* (M); Summit, Imperial Co., 4035 ft. alt., 10 June, 1917, *McGregor 954* (Stanford); southern part of California, *Fremont* (N. Y., part of *type collection*); Blair Valley, San Diego Co., 19 April, 1920, *Jepson 8681* (M, Cornell, and Calif.).

Mexico:

Lower California: mts. of Lower California, 3 July, 1884, *Orcutt 1094* (M and Calif.); Nachoguero Valley, Lower California, 4 June, 1894, *Schoenfeldt 3416* (Stanford).

The specimens of *Abrams 3596* from Campo, San Diego Co., have nearly obsolete calyx-teeth on some of the plants.

78. **M. subsecundus** Gray, Syn. Fl. N. Am. ed. 2, 2^1: Suppl. 445. 1886. Pl. 10, fig. 17.

Eunanus subsecundus Greene, Pittonia **1**: 37. 1887.

Stem freely and diffusely branched from the base, 8–21 cm. long, densely viscid-pubescent with scattered white hairs; leaves sessile, oblong or oblanceolate, .8–2.5 cm. long, .3–1.5 cm. wide, obtuse, entire or occasionally denticulate; flowers numerous, sometimes mostly on one side of the stem, frequently in spike-like terminal clusters, subsessile, the pedicels 1–2 mm. long; mature calyx broadly ovate, 7–12 mm. long, 4–5 mm. wide, more or less constricted at the oblique throat, scarious below the sinuses, angles deeply plicate, teeth short, deltoid, acute; corolla 1.7–2 cm. long, deep reddish-purple, pubescent externally, tube slender, mostly included, throat ventricose, abruptly enlarged to the somewhat spreading pinkish limb, lobes quadratish, short, subequal; stamens and style included, anthers glabrous; stigma peltate-funnelform, the lobes unequal; capsule slender, lanceolate, cylindrical, obtuse, about as long as the calyx or sometimes slightly exserted; seeds oblong, apiculate at one end, tuberculate.

Distribution: foothills of the Coast Ranges from Monterey Co. to San Luis Obispo Co., California. Not often collected.

Specimens examined:

California: dry soil near Mt. San Carlos, 3000 ft. alt., 23 July, 1861, *Brewer 780* (G, TYPE, and Calif.); Valley of the San Joaquin, 1 Aug., 1883, *Meehan* (G, Phil., and M); Tassajara Hot Springs, Monterey Co., June, 1901, *Elmer 3371* (M and Stanford); Santa Lucia Mts., May–July, 1892, *Vortriede* (Calif.); by road near creek, above San Antonio Mission, Monterey Co., 13 May, 1895, *Dudley* (Stanford); Upper San Antonio River, Santa Lucia Mts., 14–20 June, 1901, *Jepson 1651* (Calif.); Pine Mt., San Simeon Bay, San Luis Obispo Co., 22 July, 1876, *Edw. Palmer 322* (G and Calif.).

78a. Var. **viscidus** (Congdon) Grant, comb. nov.

M. viscidus Congdon in Erythea **7**: 187. 1899.

Plant more nearly erect; corolla-lobes mostly pink, more or less lined with red down the throat, sometimes with two white patches below the lower lip; anthers hairy along the back; stigma-lips equal.

Distribution: hot dry hillsides from Tuolumne Co. to Fresno Co. Commonly found on burned-over areas, often covering the ground.

Specimens examined:

California: Mokelumne Hill, Calaveras Co., 5 June, 1885, *Rattan* (Stanford); Gwin Mine, Calaveras Co., 17 May, 1902, *Jepson 1797* (Calif.); abundant in burned-over areas, Vallecito, Calaveras Co., 1748 ft. alt., 12 June, 1915, *A. L. Grant 6m* (M and Calif.); Rose Creek above Columbia, Tuolumne Co., 16 May, 1916, *A. L. Grant 781* (G, Cornell, U. S., M, Calif., and Stanford); common on burned-over area, Priest's Grade Hill below Groveland, Tuolumne Co., 3 June, 1916, *A. L. Grant 793* (M, Calif., and Stanford); Coulterville, 3 July, 1896, *Jepson 65m* (G and Calif.); Sebastopol, Mariposa Co., 4 July, 1897, *Congdon* (Calif.); Aqua Fria, Mariposa Co., 20 June, 1897, *Congdon* (Calif.); Mariposa, Mariposa Co., 10 May–17 June, 1892, *Congdon* (Stanford); Haile Ranch, Mariposa Co., June-July, 1892, *Congdon* (Calif.); Bootjack Ranch, Mariposa Co., 9 May, 13–18 June, 1892, *Congdon* (Stanford); Green Gulch, Mariposa Co., 23 May, 1904, *Congdon* (M); Raymond, Fresno Co., 9 June, 1894, *Burnham* (Pomona); Squaw Valley to Dunlap, 17 May, 1907, *Jepson 2750* (Calif.); Raymond to Yosemite, 11 June, 1891, *Fritchey 9* (M); in burns, Ione, 1910, *K. Brandegee* (Calif.); Toll House, Fresno Co., 2050 ft. alt., 13 June, 1900, *Hall & Chandler 4* (Calif.); Shut-Eye Pass, Fresno Co., 6500 ft. alt., 15 July, 1912, *Abrams 4932* (Stanford); roadside, Pinehurst to Badger, 31 May, 1921, *Ottley 1405* (Wellesley and Cornell); Greenhorn Range, Kern Co., 2–10 June, 1904, *Hall & Babcock 5033* (Calif. and Stanford); Bear Mt., Tehachapi Range, 5500 ft. alt., 26 May, 1917, *Jepson 7181* (Calif.); Nelson, Middle Tule River, 4700 ft. alt., 27 June, 1912, *Jepson 4869* (Cornell, M, and Calif.); Halstead's Ranch to Davis, n. fork of Kaweah, 2000 ft. alt., 19 June, 1900, *Jepson 566* (Calif.).

78b. Var. **constrictus** Grant[1]

Stems mostly erect, viscid-villous with long brownish hairs; cauline leaves few with long internodes; flowers chiefly in a spike-like cluster at the tips of the stems; calyx 1.2–2.4 cm. long, teeth triangular, subulate, unequal, much constricted at the narrow throat; seeds reticulate.

Distribution: Sierra Nevada Mts. from Tulare Co. to Kern Co. and in the Coast Range Mts., California.

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[1] **Mimulus subsecundus** Gray var. **constrictus** Grant, var. nov., caulis erectus, viscido-villosus; caulis foliis paucis, internodis longis, floribus fasciculatis ad apicem caulis; calycis dentibus 1.2–2.4 cm. longis, subulatis, constrictis ad fauci angustato.—Collected in a field in the Middle Tule River, 3000–4000 ft. alt., April–Sept., 1897, *C. A. Purpus 5070* (U. S. Nat. Herb., Mo. Bot. Gard. Herb. no. 106700, TYPE, and Univ. Calif. Herb.).

Specimens examined:

California: fields on the Middle Tule River, 3000–4000 ft. alt., Apr.–Sept., 1897, *Purpus 5070* (M, TYPE, U. S., and Calif.); Pine Flat, near Calif. Hot Springs, Tulare Co., 20 June, 1917, *Moxley 582* (Cornell); near Guerilla Flat, vicinity of Poso Creek Valley, Kern Co., 9 July, 1895, *Dudley 566* (Stanford); southeastern California, Apr.–Sept., 1897, *Purpus 5305* (Calif.); top, Mt. Diablo, July, 1917, *Davidson 3279* (Davidson).

79. M. decurtatus Grant[1]

Glandular-pubescent plants; stem slender, 5–10 cm. high, simple or branched from the base; leaves obovate to spatulate, .7–2 cm. long, 3–6 mm. wide, thin, entire or denticulate along the upper margin, tapering to a narrow sessile base, lower leaves petioled; pedicels slender, 2–3 mm. long; calyx in anthesis broadly campanulate, 8–9 mm. long, villous with yellowish hairs, inflated when mature, teeth broadly triangular-obtuse, very short, subequal, throat oblique, slightly or not at all constricted; corolla 1–1.2 cm. long, reddish-purple to rose-pink, tube included, throat barely exserted, funnelform, lobes short, equal, somewhat spreading; upper pair of stamens and style slightly exserted, anthers glabrous; stigma-lips unequal, upper broadly obovate, lower very short, almost obsolete; capsule lanceolate, acute, included; seeds oblong, apiculate at each end, reticulate.

Distribution: known only from the type locality.

Specimens examined:

California: Ben Lomond, Santa Cruz Co., June, 1903, *Elmer 4519* (U. S., M, TYPE, Calif. Acad., Stanford, and Pomona); N. A. Pacific Coast Flora, 1887, *Parry* (M).

80. M. Rattani Gray in Proc. Am. Acad. **20**: 307. 1885; Syn. Fl. N. Am. ed. 2, 2^1: Suppl. 444. 1886.

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[1] **Mimulus decurtatus** Grant, sp. nov., annuus glanduloso-pubescens; foliis obovatis spatulatisve, .7–2 cm. longis, 3–6 mm. latis; fructifero calyce inflato, 8–9 cm. longo, dentibus brevibus, late triangulari-obtusis, fauce obliquo; corolla 1–1.2 cm. longa, rubro-purpurea roseave, laciniis inaequalibus, brevibus; antheris glabris; stigmatis laciniis inaequalibus.—Collected at Ben Lomond, Santa Cruz Co., June, 1903, *A. D. E. Elmer 4519* (U. S. Nat. Herb., Mo. Bot. Gard. Herb. no. 106684, TYPE, Calif. Acad., Stanford Univ. Herb., and Pomona Coll. Herb.).

Eunanus Rattanii Greene in Bull. Calif. Acad. Sci. **1**: 105. 1885.

A densely glandular-pubescent plant; stem 4–15 cm. long, reddish, simple or mostly branched from the base; leaves few, sessile, oblong to oblanceolate, .8–2 cm. long, 2–3 mm. wide, entire or obscurely denticulate, basal leaves forming a small rosette, upper leaves bract-like; flowers numerous, crowded toward the ends of the stems; pedicels 1–3 mm. long; calyx viscid, broadly campanulate, rarely constricted at the oblique orifice, 5–6 mm. long, mature calyx broadly oval, 7–8 mm. long, 4–5 mm. broad, teeth 1–1.5 mm. long, triangular, mostly obtuse; corolla reddish-purple, marcescent, pubescent on the outside, 8–9 mm. long, tube included, throat narrowly funnelform, little exserted, lobes short, erect, truncate, nearly equal; upper pair of stamens exserted, glabrous; style exserted, stigma-lips unequal, the lower lip very short, sometimes almost obsolete; capsule firm, much exserted, lanceolate, attenuate, the apex often incurved; seeds oval or oblong, apiculate at both ends, papillate.

Distribution: in the Sierra Nevada Mts. and Coast Ranges, California. Rarely collected.

Specimens examined:

California: mountains of Colusa Co., under *Adenostema* bushes, June, 1884, *Rattan* (G, TYPE, and Calif.); near summit of Mt. Tamalpais, 3 July, 1886, *Curran* (G and Calif.); Ben Lomond, Santa Cruz Co., 1888, *Parry* (M); Boulder Creek, Santa Cruz Co., 1888, *Parry* (M); Mt. Diablo, 30 May, 1915, *Eastwood 4542* (Calif. Acad.).

81. **M. Torreyi** Gray in Proc. Am. Acad. **11**: 97. 1876; Bot. Calif. **1**: 565. 1876; Syn. Fl. N. Am. **2**^{1}: 275. 1878, ed. 2, and Suppl. 445. 1886; Hall, Yosemite Fl. 224. 1912. Pl. 10, fig. 16.

Eunanus Torreyi Greene in Bull. Calif. Acad. Sci. **1**: 104. 1885.

Eunanus Fremontii Gray in Pac. Rail. Rept. **6**: 83. 1857, not Benth.

Glandular-pubescent plants; stem erect, .5–3.5 cm. high, simple or branched; leaves scattered, obovate, oblong or spatulate, 1.5–3.5 cm. long, .3–1.2 cm. broad, tapering to a slender petiole, obtuse, entire or with a few scattered teeth, often reddish on the lower surface, internodes usually much longer than the leaves;

pedicels 2–3 mm. long; calyx 7–8 mm. long, campanulate, weakly angled, scarious at the base and below the sinuses, throat somewhat oblique, teeth very short, unequal, obtuse, broadly triangular, the upper one slightly larger; corolla bilabiate, 1.8–2.2 cm. long, rose-red or pink, usually with two club-shaped white or yellowish patches, bordered with dark reddish-purple below the lower lip, tube little longer than the calyx, pubescent externally, yellowish, the lower side heavily spotted with red, abruptly expanding to a broad ventricose throat, lobes short, broad, truncate, upper lip shorter than the lower, the middle lobe of the lower lip often emarginate; stamens and style included, white, the stigma-lobes unequal, broadly peltate-funnelform; capsule often slightly exserted, lanceolate, obtuse, 8 mm. long, straight or slightly curved, both forms often occurring on the same plant; seeds broadly oval.

Distribution: common in dry open gravelly places in the foothills of the Sierra Nevada Mts., California.

Specimens examined:

California: Plumas Co., 29 July, 1855, *Newberry* in Williamson's Exp. (G, TYPE); Prattville, Plumas Co., 11 July, 1907, *Heller & Kennedy 8819* (M and Stanford); Prattville, 4500 ft. alt., 5 July, 1897, *Jones* (M); Sierras in Plumas Co., 1891, *Platt* (Calif.); Spanish Peak, above Buck's Ranch, Plumas Co., Aug., 1911, *Eggleston 7677* (U. S.); Meadow Valley, Plumas Co., 4000 ft. alt., 29 June, 1912, *H. M. Hall 9298* (R. Mt.); pine flats, Warner Valley, Plumas Co., 5000 ft. alt., *Jepson 4070* (Calif.); Colby, Butte Co., July, 1896, *Austin 162* (M); Chico Meadows, Butte Co., 4000 ft. alt., 22 June, 1914, *Heller* (M); Forest Ranch, Butte Co., 2700 ft. alt., 18 May, 1914, *Heller 11414* (M, Calif., and Stanford); near Stirling, Butte Co., 3525 ft. alt., 7 June, 1913, *Heller 10799* (M, Calif., and Stanford); De Sabla, Butte Co., June, 1917, *Edwards* (Stanford); Sugar Loaf Hill, Nevada City, 11 June, 1893, *Dudley* (Stanford); Bear Valley near Emigrant Gap, Nevada Co., 4500 ft. alt., 21 July, 1898, *Jepson 69m* (Calif.); near Donner Lake, 1865, *Torrey 370* (G); lower end of Donner Lake, Nevada Co., 6 Aug., 1903, *Heller 6870* (Phil., M, R. Mt., Calif., Stanford, and Pomona); near Placerville, Eldorado Co., 3200 ft.

alt., 12 Sept., 1915, *Heller 12271* (Cornell, M, and Stanford); waste ground, Truckee, 27 June, 1884, *Sonne 271* (M and Stanford); Lake Tahoe, 1 Aug., 1891, *Evans* (M); near Lake Tahoe, 31 Aug., 1872, *Redfield 247* (M); Fallen Leaf Lake near Lake Tahoe, 6700 ft. alt., July, 1906, *J. H. Thompson* (Stanford); Eldorado Co., 1866, *Rattan* (Stanford); Ham's, Amador Co., 5000 ft. alt., May, 1895, *Hansen 1125* (M and Stanford); Grass Valley, Amador Co., 3000 ft. alt., May, 1895, *Hansen 1124* (M and Stanford); Big Trees, Calaveras Co., 4700 ft. alt., 8 June, 1917, *A. L. Grant 963* (G, Cornell, N. Y., M, R. Mt., Ore., Calif., and Pomona); near Gardner, Calaveras Co., Aug., 1903, *Hall & Chandler 4782* (R. Mt. and Calif.); near Ranger's Cabin, Hog Ranch, Tuolumne Co., 11 June, 1916, *A. L. Grant 850* (M, Calif., and Stanford); Hog Ranch, Tuolumne Co., 16 June, 1917, *A. L. Grant 969* (G, U. S., Cornell, Phil., M, Ore., and Pomona); Hog Ranch to Crocker's, Yosemite Park, 4500 ft. alt., 3 Aug., 1911, *Jepson 4635* (Calif.); near Mariposa Big Trees, 6000 ft. alt., 22 June, 1918, *A. L. Grant 1300* (Cornell, M, Stanford, and Calif.); Darrah, Mariposa Co., June and July, 1892, *Congdon* (Calif. and Stanford); Wawona, Yosemite Route, 19 June, 1891, *Fritchey 69* (M); Clark's Ranch to Peregoy's, Yosemite Park, 1872, *Gray* (G); Fish Camp, Mariposa Co., 29 June, 1919, *Jepson 8396* (M and Calif.); Pine Ridge, Fresno Co., 5300 ft. alt., 15–25 June, 1900, *Hall & Chandler 64* (M and Stanford).

Although the type of *M. Torreyi* was collected in Plumas Co. by Newberry on Williamson's Expedition, the plant was named for Dr. Torrey, who secured abundant material near Donner Lake.

82. **M. Layneae** (Greene) Jepson, Fl. W. Mid. Calif. 405. 1902, and ed. 2, 378. 1911. Pl. 9, fig. 4.

Eunanus Layneae Greene in Bull. Calif. Acad. Sci. 1: 104. 1885.

Stem slender, more or less reddish, simple or often freely branched, densely glandular-pubescent, usually somewhat nigrescent; leaves narrowly oblong or linear, 1–2.5 cm. long, 2–6 mm. broad, acute, entire or slightly toothed, tapering to a slender, mostly sessile base, the lower sometimes short-petioled, frequently reddish on the lower surface; pedicels slender, reddish, 1–2 mm. long; calyx 5–7 mm. long, campanulate, becoming somewhat inflated and strongly ribbed when mature, slightly constricted at the oblique orifice, teeth triangular, acute or subulate, 1–2 mm. long, reflexed; corolla rose-red to reddish-purple, streaked down the throat, 1.5–2.2 cm. long, more or less pubescent externally, tube exserted, usually less than twice as long as the calyx, throat funnelform, dark reddish-purple, with one or two white or yellow patches generally bordered with dark red and spotted with red below the lower lip, lobes subequal, not widely spreading, truncate, often slightly emarginate and with rounded sinuses; stamens included, anthers hispid; style included, stigma-lobes broadly ovate, rounded, the lower scarcely more than half the length of the upper lobe; capsule usually exserted, 9–11 mm. long, lanceolate with an obtuse, mostly incurved slender apex; seeds oval, apiculate at both ends, tuberculate and faintly ribbed.

Distribution: dry sandy places, often growing in large patches, in the North Coast Range and Sierra Nevada Mts., from Siskiyou Co. to Fresno Co., California.

Specimens examined:

California: Dunsmuir, Siskiyou Co., 2200 ft. alt., 14 August, 1914, *Jepson 6169* (Calif.); Igerna, Siskiyou Co., 5 April, 1903, *Copeland,* distributed as *C. F. Baker 3851* (Stanford and Pomona); near Sisson, 3555 ft. alt., 1–10 June, 1897, *H. E. Brown 303* (M); dry land, Goosenest at Sisson's, base of Mt. Shasta, 21 Aug., 1880, *Engelmann* (M); Goosenest foothills, Siskiyou Co., 5000 ft. alt., 19 June, 1910, *Butler 1585* (M, R. Mt., and Stanford); near Edgewood, Siskiyou Co., 28–31 July, 1892, *Edw. Palmer 2603* (U. S.); near Shasta Springs, 5 June, 1905, *Heller 7963* (M), Squaw Creek Ranger Station, Shasta Co., June, 1916, *Drew* (Stanford); Shasta Springs, Aug., 1894, *Jepson 36m* (Calif.); between forks of Trinity, June, 1883, *Rattan* (Stanford, *type collection*); Horseshoe Bend above Shasta Springs, July–Aug., 1894, *Jepson 34m* (Calif.); hill slopes of Mad River Valley, 6 miles above Ruth, Trinity Co., 3000 ft. alt., 24 June, 1913, *Tracy 4320* (G, M, R. Mt., and Calif.); region of Lassen's Peak, Aug., 1891, *Chestnut & Drew* (Calif.); near Redding, 18 June, 1914, *McMurphy* (Stanford); Valley of Trinity River, near mouth of Willow Creek, Humboldt Co., 500 ft. alt., 8 July, 1911, *Tracy 3443* (G and Calif.); between Sisson's and Sims, 24 July–10 Aug., 1894, *Jepson 71m* (Calif.); Shasta Co., 1887, *Parry* (M); Red Mt., s. e. Mendocino Co., 18 June, 1908, *Jepson 3037a* (M and Calif.); Burnt Ranch, Humboldt Co., June, 1883, *Rattan* (G); between Mud Flat and Bennett Spring on the Newville-Covelo Road, Glenn Co., 2500 ft. alt., 3 June, 1915, *Heller 11919* (M and Stanford); Bartlett Mt., Lake Co., 1884, *K. Brandegee* (Calif.); near Bartlett Springs, Aug., 1916, *Stinchfield* (Stanford); Indian Valley, near Lake Co., 24 May, 1920, *Jepson 9000* (Calif.); Howell Mt., Napa Co., 26 June, 1893, *Jepson 35m* (Calif.); in chaparral, Howell Mt., Napa Co., 1400 ft. alt., 19 May, 1902, *Tracy 1544* (U. S. and Stanford); Auburn, Placer Co., 3 April, 1894, *Congdon* (Calif.); Italian Bar, near Columbia, Tuolumne Co., 2000 ft. alt., 5 June, 1915, *A. L. Grant* (M and Stanford); Hog Ranch above Hetch-Hetchy Valley, 14 June, 1917, *A. L. Grant 968* (G, Cornell, U. S., N. Y., Phil., M, R. Mt., Ore., Calif., Stanford, and Pomona); Little Yosemite, 6300 ft. alt., 5 July, 1909, *Jepson 3142* (Calif.); growing in sandy soil, often forming large patches, Little Yosemite Valley, 7 July, 1911, *H. M. Hall 9056* (G, R. Mt., Stanford, and Pomona); Snow Creek, Yosemite, 7100 ft. alt., 6 Aug., 1916, *Smiley 669* (G); Yosemite, 5500 ft. alt., 1 July, 1911, *Abrams 4584* (Stanford); Tamarack Flat, Yosemite, 6390 ft. alt., 14 July, 1911, *Abrams 4694* (G and Stanford); Upper San Joaquin, Madera Co., 17 Aug., 1895, *Congdon* (Stanford); Chihuahua Falls, Mariposa Co., 12 Aug., 1895, *Congdon* (G); near Jackass Meadows, Madera Co., 17 Aug., 1895, *Congdon* (G); Pine Ridge, Fresno Co., 5300 ft. alt., 15–25 June, 1900, *Hall & Chandler 208* (M and Stanford); Beasore Meadow, Mariposa Co., 24 July, 1918, *A. L. Grant 1310* (Phil., Cornell, M, and Calif.); Mono Hot Springs, Fresno Co., 6300 ft. alt., 3 Aug., 1918, *A. L. Grant 1494* (M and Calif.); near Peregoy Meadow, Yosemite National Park, 7000 ft. alt., 21 June, 1918, *A. L. Grant 1296* (Calif.); Alder Creek Trail, Yosemite Park, 5500 ft. alt., 1 July, 1911, *Jepson 4327* (Calif.);

abundant in sandy spots, trail to Dinkey Grove of Big Trees, near Dinkey Station, Fresno Co., 5500 ft. alt., 29 July, 1917, *A. L. Grant 1200* (M and Calif.); in dry sandy places, often in large patches, Huntington Lake, Fresno Co., 7000 ft. alt., 21 July, 1918, *A. L. Grant 1458* (G, M, and Calif.); Huntington Lake, Fresno Co., 7000 ft. alt., 5 July, 1917, *A. L. Grant 1041* (Cornell, M, and Calif.); Huntington Lake, Fresno Co., 7000 ft. alt., 16 July, 1917, *A. L. Grant 1102* (G, Cornell, Phil., M, R. Mt., Calif., Stanford, Ore., and Pomona); Arnold Meadow, Madera Co., 26 July, 1918, *A. L. Grant 1356* (Cornell, M, and Calif.); King's Cañon bed, King's River Cañon and Kearsarge Pass, Sierra Nevada, 5–15 July, 1900, *Jepson 775* (Calif.).

This species is so closely related to *M. Torreyi* that it is not always easy to separate them by the shape of the calyx-teeth and capsule, as Greene suggested when he described *M. Layneae.* Typical specimens of *M. Torreyi* have blunt calyx-teeth but sometimes calyces with blunt teeth or acute teeth are found on the same plant. The most constant characters for separating the two species are found in the corolla, *M. Layneae* having a slender, much exserted reddish-purple corolla-tube and a narrow throat, whereas *M. Torreyi* has a little exserted, yellowish or pink corolla-tube with a broad, somewhat ventricose throat and pink or rose-pink lobes. The specimens of *M. Layneae* from northern California have densely pubescent corolla-tubes, and those from central California are sometimes nearly glabrous.

83. **M. nanus** Hook. & Arn. Bot. Beechey's Voyage, 378. 1840; Gray in Proc. Am. Acad. **11**: 96. 1876; Bot. Calif. **1**: 564. 1876; Syn. Fl. N. Am. **2**^{1}: 274. 1878, ed. 2, excl. the yellow-flowered plant, and Suppl. 444. 1886; Piper, Contr. U. S. Nat. Herb. **11**: 508. 1906; Nelson in Coulter & Nelson, Manual Cent. Rocky Mountains, 453. 1909; Hall, Yosemite Fl. 224. 1912.

M. nanus α pluriflorus Hook. & Arn. Bot. Beechey's Voyage, 378. 1840.

Eunanus Tolmei Benth. DC. Prodr. **10**: 374. 1846; Greene in Bull. Calif. Acad. Sci. **1**: 103. 1885; Howell, Fl. Northwest Am. 518. 1903; Rydb. Fl. Rocky Mountains, 780. 1917.

Eunanus nanus Holzinger, Contr. U. S. Nat. Herb. **3**: 244. 1895.

Small leafy plants, viscid-puberulent or sometimes densely glandular-pubescent, 5–15 cm. high, usually freely branched from near the base, branches low and spreading; stems mostly straw-colored, occasionally more or less tinged with red; leaves obovate to oblong, 1–3 cm. long, 2–6 mm. broad, acute or obtuse, thin, entire, 1–3-nerved, lower leaves larger and somewhat spatulate, tapering to a distinct petiole; flowers abundant, pedicels slender, 2–3 mm. long; calyx tubular-campanulate, 7–8 mm. long, scarious below the sinuses, throat slightly if at all oblique, not constricted, teeth nearly equal, triangular-acute, about one-fourth as long as the tube; corolla bilabiate, 1.7–2 cm. long, reddish-purple, puberulent outside, tube yellowish, slender, exserted, about twice as long as the calyx, throat funnelform with two hairy white or yellow patches dotted with red below the lower lip and irregular darker reddish-purple areas below the upper lip, lobes unequal, sinuses broad, rounded, upper lip more or less erect and longer than the lower one; anthers hispid, filaments of the longer pair of stamens sometimes puberulent; style and upper pair of stamens slightly exserted, stigma-lobes nearly equal, peltate-funnelform, ciliate; capsule in general slightly exceeding the calyx, ovate, obtuse; seeds oval, reticulate, apiculate at each end.

Distribution: common in open sandy places in the Rocky Mountains and in the Pacific Coast States.

Specimens examined:

Montana: in dry ground, Madison Basin, Gallatin Co., 23 June, 1899, *Nelson & Nelson 5494* (R. Mt.).

Wyoming: Fire Hole, Yellowstone Park, July, 1904, *Oleson 14*, (R. Mt.); Lower Basin, Yellowstone Park, 15 July, 1906, *Cooper 61y* (R. Mt.); on sandy or gravelly open flats, Upper Geyser Basin, 31 July, 1899, *Nelson & Nelson 6256* (Cornell, M, R. Mt., and Pomona); Yellowstone Park, 9 Aug., 1885, *Letterman 116* (M); ant hills, Henry's Fork, Snake River, 5400 ft. alt., 19 June, 1860, *Hayden* (M).

Colorado: Graymont, without date, *Letterman* (M).

Idaho: grows only on ant hills, Shoshone Flat, Minidoka National Forest, 6300 ft. alt., 3 Aug., 1913, *Crockett 29* (R. Mt.); Lake

Waha, Nez Perces Co., 3500–4000 ft. alt., 25 June, 1896, *Heller & Heller 3324* (M); Corral, Blaine Co., 28 June, 1916, *Macbride & Payson 2930* (R. Mt. and M); Martin, Blaine Co., 5 July, 1916, *Macbride & Payson 3049* (M and R. Mt.); sandy gravelly slopes, Falk's Store, Canyon Co., 17 May, 1910, *Macbride 59* (M, R. Mt., Calif., and Stanford); sandy slopes, Silver City, Owyhee Co., 15 June, 1910, *Macbride 402* (M and R. Mt.); Indian Gulch, 18 June, 1892, *Mulford* (M); Ketchum, 25 June, 1892, *Mulford* (M); gravelly bench lands, Ketchum, Blaine Co., 20 July, 1911, *Nelson & Macbride 1227* (R. Mt.); Sawtooth National Forest, 1910, *Woods 42a* (R. Mt.); dry hills, Boise River, 27 July, 1911, *Clarke 162* (R. Mt.).

Nevada: Little Lakes Canyon, Elko Co., 21 July, 1902, *Kennedy 598* (R. Mt.); Eagle Valley, Ormsby Co., 7 June, 1902, *C. F. Baker 1024* (M and Pomona); near Holstein Ranch, north of Carson, 29 May, 1901, *Steinmetz* (Stanford).

Oregon: common in dry soil, eastern Oregon, 12 July, 1898, *Cusick 2152* (Cornell and M); hillsides of Ochoco Creek, Crook Co., 10 July, 1901, *Cusick 2655* (Cornell, M, and R. Mt.); vicinity of Laidlaw, Crook Co., 6 June, 1912, *Whited 48* (Ore.); common on plains, Bend, Crook Co., 8 May, 1905, *E. Nelson 797* (M and R. Mt.); Redmond, 15 May, 1916, *Jackson & Hammond* (Ore.); Camp Harney, 1875, *Bendire* (M); sandy woods along Klamath Falls, 21 July, 1920, *Peck 9628* (M); dry sandy ground, 10 miles from Crescent, Klamath Co., 19 July, 1920, *Peck 9577* (M).

California: near Old Chat, Lassen Co., 1 July, 1907, *Heller & Kennedy 8673* (Phil., M, and Stanford); Yollo Bolley Mts., July, 1897, *Jepson 37m* (Calif.); Hobart Mills, 29 May, 1917, *Wagner* (Stanford).

84. M. Austinae (Greene) Grant, comb. nov.

Eunanus Austinae Greene, Pittonia **1**: 36. 1887.

A mostly glandular-puberulent plant, sometimes glandular-pubescent; stem 5–9 cm. long, freely branched from the base; leaves numerous, clustered with the flowers toward the ends of the stem and branches, spatulate or elliptical, 1.2–2 cm. long, 3–4 mm. wide, tapering to a short, slender petiole, entire; calyx

7–8 mm. long, not distended by the mature capsule, teeth unequal, triangular-acute, about one-third as long as the tube; corolla funnelform, bilabiate, yellow, more or less streaked with red down the throat, tube about 1½ times as long as the calyx, throat short, narrow, lobes unequal; stamens included, anthers hispid; style exserted, the stigma-lips equal, broadly peltate-funnelform; capsule lanceolate, attenuate, exserted; seeds oblong, reticulate.

Distribution: mountains of northern California.

Specimens examined:

California: Pine Creek, Modoc Co., 1893, *Austin* (Stanford); Modoc Co., July, 1895, *Austin 16* (Pomona); Big Valley, Lassen Co., 20 June, 1894, *Baker & Nutting* (Calif.).

According to Dr. Greene, *M. Austinae* does not have the skunk-like odor of *M. mephiticus*.

85. **M. clivicola** Greenm. in Erythea **7**: 119. 1899; Piper & Beattie, Fl. Southeast. Wash. & Adj. Idaho, 227. 1914.

Eunanus clivicola Heller in Muhlenbergia **1**: 60. 1904.

Glandular-pubescent plants; stem 5–15 cm. high, mostly simple; leaves scattered, oblong or obovate to oblanceolate, 1–2.5 cm. long, 4–8 mm. broad, entire or occasionally toothed toward the upper end, tapering to a slender sessile base, mostly 1-nerved; flowers scattered, pedicels slender, 3–7 mm. long; calyx campanulate, 8–10 mm. long, narrowed at the base, flaring abruptly to a wide-open slightly oblique throat at maturity, scarious between the green ribs, teeth broadly triangular-acute, ciliate, nearly equal, 1–1.5 mm. long; corolla funnelform, somewhat bilabiate, 1.4–2 cm. long, tube yellowish, slightly exserted, throat reddish-pink with a large yellow patch, spotted with red below the lower lip, lobes reddish-pink, streaked with darker reddish-purple, spreading, rounded, with broad sinuses; stamens included, the anthers sparsely hispid; style frequently as long as the throat, stigma-lips equal; capsule linear-lanceolate, exserted, incurved at the apex; seeds favose-areolate, apiculate at both ends, oval, less than twice as long as broad.

Distribution: hillsides in southwestern Idaho, Washington, and Oregon.

Specimens examined:

Idaho: slopes near the foot of Weissner's Peak, Kootenai Co., 5–7 July, 1892, *Sandberg, MacDougal & Heller 586* (G, TYPE, and Phil.); dry hillsides of Cedar Mts., Latah Co., 7 July, 1893, *Piper 1657* (G and Stanford); Lake Waha, 26 June, 1894, *Henderson 2677* (G, Cornell, and R. Mt.).

Oregon: moist gulch of North Pine Creek, near Snake River, 13 July, 1899, *Cusick 2236* (G, Cornell, F, M, R. Mt., and Calif.); hills near Snake River, 25 May, 1898, *Cusick 1891*, (Cornell and M); Deshut's Bridge, 19 June, 1885, *Howell* (Ore. and Calif.).

86. **M. angustifolius** (Greene) Grant, comb. nov.

Eunanus angustifolius Greene, Pittonia **2:** 23. 1889.

A glandular-pubescent annual; stem red, 4–10 cm. high, mostly branched; leaves numerous, linear or oblanceolate, 1–1.7 cm. long, 1–3 mm. wide, sessile, entire, crowded and often with smaller leaves fascicled in the lower axils; calyx cylindrical, scarious between the red ribs, teeth triangular-lanceolate, fully one-third as long as the calyx, spreading very little at the oblique orifice; corolla bilabiate, narrowly funnelform, sparsely pubescent on the outside, reddish purple, 1.3–1.7 cm. long, the tube exserted, lobes unequal, those of the upper lip about half as long as the lower; stamens slightly exserted, glabrous; stigma-lobes unequal; capsule lanceolate, about as long as the calyx, opening to the base along both sutures.

Distribution: known only from Washoe Mts., Nevada, the type locality.

Specimens examined:

Nevada: on trail from Bronco to Mt. Rose, western slope of Washoe Mts., July, 1889, *Sonne 14* (Greene, TYPE, and Calif.); Mt. Rose, Washoe Co., 9500 ft. alt., 26 Aug., 1911, *Heller 10343* (G and Stanford).

87. **M. densus** Grant[1]

A more or less densely glandular-pubescent and viscid plant, sometimes viscid-villous; stem mostly profusely branched, 5–15 cm. high; leaves numerous, elliptical, linear or occasionally oblong, 1.5–2.5 cm. long, 2–5 mm. broad, tapering to a slender sessile base; flowers axillary, numerous, pedicels 2–5 mm. long; calyx open-campanulate, 6–10 mm. long, not distended by the mature capsule, teeth deltoid-acute to subulate, unequal, about one-fourth as long as the tube, throat oblique; corolla funnelform, 1.7–2 cm. long, yellow, more or less streaked and tinged with red or sometimes wholly red, tube slender, about twice as long as the calyx, throat short, expanded, lobes spreading, somewhat quadrangular, subequal, a hairy region below the lower lip and with scattered hairs around the throat; upper pair of stamens sometimes exserted, anthers hispid; style exserted, stigma-lobes broadly peltate-funnelform, unequal; capsule lanceolate to ovate-lanceolate, more or less attenuate, as long as or, more commonly, exceeding the calyx; seeds oblong, apiculate at both ends.

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[1] **Mimulus densus** Grant, sp. nov., herba plus minusve dense glanduloso-pubescens; caule profuse ramoso, 5–15 cm. alto; foliis ellipticis, linearibus oblongisve; calyce

Distribution: central and western Nevada and east of the Sierra Nevada Mts., from Inyo Co. north to Lassen Co., California.

Specimens examined:

Nevada: hills around Austin, Lander Co., Toiyabe Range, 6400 ft. alt., 21–25 July, 1913, *Kennedy 4401* (M, TYPE, and Stanford); between Austin and Big Creek, Lander Co., 6000 ft. alt., 27 July, 1913, *Kennedy 4091* (Stanford); Tonopah, 6000 ft. alt., June, 1907, *Shockley 84* (Calif. and Stanford); Miller Mt., Esmeralda Co., 7000 ft. alt., *Shockley 111* (Stanford).

California: Campito Meadow, White Mts., 11000 ft. alt., 27 July, 1917, *Jepson 7305* (Calif.); Black Canyon, White Mts., 7 July, 1891, *Coville & Funston 1792* (Stanford); Indian Valley Grade, July, 1896, *Bruce 847* (M); near the river, Portola, Plumas Co., 30 July, 1911, *K. Brandegee* (Calif.); Pine Creek, Lassen Co., 12 July, 1894, *Baker & Nutting* (R. Mt.); near Old Chat, Lassen Co., 1 July, 1907, *Heller & Kennedy 8672* (M and Stanford); Truckee, Nevada Co., 15 Aug., 1903, *Heller 7173* (M and Pomona).

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lato-campanulato, dentibus inaequalibus; corolla 1.7–2 cm. longa, flava, plus minusve rubro-colorata, aliquandro rubra, tubo calyce duplo longiore; antheris hispidis; capsula lanceolata.—Collected in the hills around Austin, Lander Co., Toiyabe Range, 6400 ft. alt., 21–25 July, 1913, *P. B. Kennedy 4401* (Mo. Bot. Gard. Herb. no. 715524, TYPE, and Stanford Univ. Herb.).

This is a different-looking plant from *M. mephiticus* with which it has been confused. The structural characters are similar but *M. densus* has a different kind of pubescence, the plant is ranker in growth, freely branched from the base, and the stems are generally crowded with leaves and flowers. The capsule is usually attenuate, more or less exserted, and varies in shape from ovate-lanceolate, not much stouter than that of *M. mephiticus*, to distinctly lanceolate, the latter being the more common form. The color is not at all constant; the corolla in the type and *Jepson 7305* is yellow with a few reddish-brown markings; in *Heller & Kennedy 8672* the tube and throat are red, whereas the plants collected by Mrs. Bruce on the Indian Valley Grade, by *Kennedy 4401* and *4091*, and *Heller 7173*, have dark red flowers.

88. **M. mephiticus** Greene in Bull. Calif. Acad. Sci. **1**: 9. 1884; Gray, Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 444. 1886; Smiley in Univ. Calif. Publ. Bot. **9**: 334. 1921.

Eunanus mephiticus Greene in Bull. Calif. Acad. Sci. **1**: 102. 1885.

Stems erect, 4–12 cm. high, simple or branched, the whole plant more or less glandular-pubescent and viscid; leaves elliptical, oblanceolate or nearly linear, 1–2 cm. long, 2–5 mm. broad, obtuse or acute, entire, generally tapering to a short petiole; flowers appearing in the lowest axils but mostly clustered with the leaves toward the tips of the stems, pedicels slender, 2–4 mm. long; calyx open-campanulate, 4–6 mm. long, scarious below the sinuses and distended by the mature capsule, teeth lanceolate, acute or sometimes subulate, unequal, usually one-fourth the length of the tube, throat oblique; corolla funnelform, 1.2–1.8 cm. long, yellow, rarely reddish-purple, the slender tube at least 1½ times as long as the calyx, throat broad, more or less tinged, spotted or streaked with reddish-brown, lobes nearly equal, subquadrate, with broad rounded sinuses; stamens and style usually included, rarely slightly exserted, anthers hispid, filaments with retrorse hairs at the base of the longer pair; stigma-lobes broadly peltate-funnelform, subequal or occasionally equal; capsule lanceolate, obtuse, as long as the distended calyx, more often exserted; seeds oval, less than half as long as broad, apiculate at both ends, reticulate.

Distribution: common in open woods and sandy places in the Sierra Nevada Mts., from Amador Co. to Fresno Co., California. Odor strongly mephitic.

Specimens examined:

California: Pedlar, Amador Co., 6500 ft. alt., July, 1892, *Hansen 463* (M and Stanford); moist sandy spots, Strawberry Lake near the dam, Tuolumne Co., 5500 ft. alt., 10 June, 1917, *A. L. Grant 956* (M); Cottonwood Trail, Hetch-Hetchy Valley, 6500 ft. alt., 15 June, 1918, *A. L. Grant 1270* (Cornell, M, and Calif.); Yosemite, July, 1884, *Hutchings* (G); above Yosemite, *Dix* (G); growing in sandy soil, often forming large yellow beds, Little Yosemite Valley, 7 July, 1911, *H. M. Hall 9055* (M, R. Mt., Stanford, and Pomona); Lake Merced, Yosemite Park, 7200 ft. alt., 10 July, 1909, *Jepson 3214a* (Calif.); Tamarack Flat, Yosemite Park, 6390 ft. alt., 14 July, 1911, *Abrams 4695* (Stanford); at Peregoy's, 1872, *Gray* (G); near Peregoy Meadow, Yosemite Park, 7200 ft. alt., 21 June, 1918, *A. L. Grant 1298a* (Cornell and M); King's River Cañon, Fresno Co., 15 June, 1921, *Ottley 1487* (Wellesley and M); granite sand between Rowell and Sunset Meadows, King's River Region, Fresno Co., Aug., 1904, *Dudley* (Stanford); South Fork Kaweah Crossing near Sand Meadow, Sequoia Park, 8200 ft. alt., 14 Aug., 1911, *Jepson 4674* (Cornell, M, and Calif.); Round Meadow., Sequoia Nat'l. Park, 6500 ft. alt., 24 June–2 July, 1900, *Jepson 699* (M and Calif.); Hossack Creek, eastern Tulare Co., 7000 ft. alt., 12 July, 1908, *Hall & Hall 8346* (Calif.); Alta Meadows, 9000 ft. alt., Aug., 1905, *K. Brandegee* (G); Alta Meadows, Tulare Co., 19 July, 1919, *Newlon 1m* (Cornell, M, and Calif.); Hockett Meadows, Tulare Co., about 8500 ft. alt., 5 Aug., 1904, *Hall & Babcock 5622* (Calif. and Pomona); South Fork Middle Tule River, 5300 ft. alt., 28 June, 1912, *Jepson 4874* (M); Hockett's Meadow, Tulare Co., 22 July, 1904, *Culbertson 4410* (Calif., Stanford, and Pomona); Little Kern River, Tulare Co., July, 1904, *Hall & Babcock 5405* (Stanford); brook one mile above Parson's Mill, Poso Creek Valley, 9 July, 1895, *Dudley 590* (Stanford); plains, Little Kern River, 6000–7000 ft. alt., July, 1895, *Purpus 1383* (Calif.); sandy plains, Trout Meadows, July, 1895, *Purpus 1389* (Calif.).

89. M. coccineus Congdon in Erythea **7**: 187. 1899.

Stems 2–6 cm. high, simple or branched, the whole plant glandular-puberulent; leaves oblanceolate to linear, .6–1 cm. long, 2–3 mm. broad, entire, mostly obtuse, tapering to a slender petiole, the lower often spatulate; flowers clustered at the tips of the stems, pedicels rarely over 1 mm. long; calyx cylindrical, 3–5 mm. long, expanded by the mature capsule and faintly ribbed, throat oblique, teeth unequal, linear, subulate, one-third to one-half as long as the tube; corolla funnelform, 1.6–2 cm. long, deep reddish-purple, the throat usually with one or two lighter areas below the lower lip, tube slender, 2–3 times as long as the calyx, limb expanded, .5–1.2 cm. wide, the lobes subequal, withering almost filiform; stamens mostly included, the anthers hispid; style slightly exserted, the lobes subequal; capsule broadly ovate, acute, slightly exceeding the calyx; seeds smooth.

Distribution: in granite sand at high altitudes in the southern Sierra Nevada Mts. Not often collected.

Specimens examined:

California: Glacier Point Turnpike, Mariposa Co., 22 July, 1891, *Congdon* (Calif. and Stanford); Hockett's Meadow, 8600 ft. alt., 22 July, 1904, *Culbertson*, distributed as *C. F. Baker 4411* (M and Pomona); between Rowell Meadow and Sunset Meadow, King's River Region, Fresno Co., Aug., 1904, *Dudley* (Stanford); Coyote Pass Trail, Milky Meadow to Three Rivers, 25–31 July, 1900, *Jepson 979* (Calif.); Marble Mt., 6 July, 1907, *Jepson 2846* (Calif.); N. Fork of Middle Tule River, 8500 ft. alt., 15 Aug., 1911, *Jepson 4688* (Calif.).

This species was first collected by Congdon near the mountain tops of the Sierras, east of the Minaret's.

90. M. stamineus Grant[1]

Plants 2–10 cm. high, freely branched from the base or occasionally simple, densely glandular-pubescent; leaves sessile, numerous, narrowly oblanceolate to elliptical or sometimes linear, 1–2.5 cm. long, 2–5 mm. broad, obtuse, entire; flowers somewhat clustered toward the tips of the branches, numerous, axillary, pedicels 1–2 mm. long; calyx tubular, 5–8 mm. long, expanded by the mature capsule, teeth lanceolate-subulate, one-third to one-fourth the length of the tube, the lower smaller and shorter, throat oblique; corolla funnelform, reddish-purple, 1.2–2 cm. long, pubescent externally, tube slender, less than twice as long as the calyx, throat short, with a yellowish area spotted with red below the lower lip, the whole with long scattered club-shaped hairs, lobes broad, somewhat truncate, nearly equal, little spreading; stamens exserted, anthers hispid, filaments unequally inserted, the longer with retrorse hairs near the base; style exserted, stigma-lips unequal, rounded, broadly peltate-funnelform; capsule oblong, obtuse, usually about as long as the calyx or slightly exserted; seeds oblong, apiculate at each end.

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[1] **Mimulus stamineus** Grant, sp. nov., herba, 2–10 cm. alta, dense glanduloso-pubescens; foliis sessilibus, anguste oblanceolatis ellipticisve, aliquando linearibus, obtusis; calyce 5–8 mm. longo, dentibus lanceolatis-subulatis; corolla rubro-purpurea, 1.2–2 cm. longa, lobis inaequalibus; antheris hispidis; capsula oblonga.—Collected in granite sand, summit of Sonora Pass, Tuolumne Co., 10000 ft. alt., 24 Aug., 1915, *Adele Lewis Grant 357* (Cornell Univ. Herb., Mo. Bot. Gard. Herb. no. 893571, TYPE, Univ. Calif. Herb., and Stanford Univ. Herb.).

Distribution: Washington, Nevada, and California.

Specimens examined:

Washington: Klickitat, June, 1879, *J. Howell* (G and M); Klickitat, 16 May, 1882, *Howell* (Ore.).

Nevada: King's Cañon, Ormsby Co., 5 June, 1902, *C. F. Baker 1010* (M and Pomona); Snow Valley, Ormsby Co., 27 July, 1902, *C. F. Baker 1375* (M, R. Mt., Calif., and Pomona); Miller Mt., Esmeralda Co., 7000 ft. alt., without date, *Shockley 301A* (Stanford).

California: Black Cañon, White Mts., Mono Co., 8 July, 1891, *Coville & Funston 1798* (Cornell, M, and Stanford); sandy field, Myers, Eldorado Co., 2 July, 1920, *Ottley 930* (Wellesley and M); near Deadman's Creek, Mono Co., 22 Aug., 1895, *Congdon* (Calif. and Stanford); dry valley floor near Mono Crater, Mono Co., 19 July, 1918, *Ferris 1464* (Stanford); growing in granite sand, summit of Sonora Pass, Tuolumne Co., 10000 ft. alt., 24 Aug., 1915, *A. L. Grant 357* (M, TYPE, Cornell, Calif., and Stanford); Campito Meadow, White Mts., 11000 ft. alt., 27 July, 1917, *Jepson 7304* (Calif.); Rock Creek near Mt. Whitney, 9600 ft. alt., 20 July, 1912, *Jepson 5057* (Calif.); Ramshaw Meadows, Kern Peak, 8600 ft. alt., 3 July, 1912, *Jepson 4957* (collected by *Haskell*) (Calif.); Kern River, 9850 ft. alt., Sept., 1875, *Rothrock 378* (G); Volcano Meadow, vicinity of Mt. Whitney, 8 Aug., 1897, *Dudley 2498* (Stanford); Whitney Meadows, 19 Aug., 1891, *Coville & Funston 1625* (Cornell, M, and Stanford); border of Whitney Meadow, 10300 ft. alt., Aug., 1897, *Dudley 2488* (Stanford); Milky Meadow, Tulare Co., 23–31 July, 1900, *Jepson 946* (Calif.); Olancha Mt., Tulare Co., 8000 ft. alt., June, 1904, *Hall & Babcock 5218* (M and R. Mt.).

91. M. leptaleus Gray in Proc. Am. Acad. **11**: 96. 1876; Bot. Calif. **1**: 564. 1876, in part; Syn. Fl. N. Am. **2**^{1}: 274. 1878, ed. 2, and Suppl. 445. 1886, in part.

Eunanus leptaleus Greene in Bull. Calif. Acad. Sci. **1**: 101. 1885.

Small plants, viscid-pubescent to almost glabrous, commonly 2–4 cm. high, occasionally 6–10 cm. high, the taller plants usually branched; stem slender, mostly reddish; leaves obovate, oblanceolate or linear, .5–1.5 cm. long, 1–3 mm. wide, thick, obtuse, rarely acute, 1-nerved, entire, tapering to a short slender petiole or the uppermost ones sessile, usually clustered with the flowers at the tips of the stems, often tinged with red and with a red midrib; pedicels almost filiform, 1–2 mm. long; calyx slender, cylindrical, usually more or less tinged with red, 3–4 mm. long, becoming distended and completely filled with the mature capsule, obscuring the angles, throat slightly oblique, teeth from one-third to one-half the length of the tube; corolla slender, funnelform, 8–10 mm. long, reddish-purple, tube exserted at least half the length of the calyx, throat beardless with a large yellowish or white patch spotted with red down the anterior part, lobes short, squarish, mostly equal, limb about 3 mm. in diameter, the whole withering persistent and becoming filiform; stamens included, not approximate, anthers reflexed, glabrous; style and stigma included, stigma-lobes very unequal, ovate, acute; capsule broadly oblong-ovate, obtuse, compressed, little longer than the calyx; seeds smooth, oval, apiculate at both ends, less than twice as long as broad.

Distribution: open gravelly places in the high Sierra Nevada Mts., California.

Specimens examined:

California: Lassen's Peak, Aug., 1896, *Bruce 423* (M); rocky meadow above Glen Alpine Springs, Eldorado Co., 18 June, 1920, *Ottley 786* (Wellesley and M); Mt. Tallac, Lake Tahoe Region, 9500 ft.alt., 25 Aug., 1909, *McGregor 191* (Stanford); Soda Springs, Nevada Co., 7000 ft. alt., 20 July, 1881, *Jones 2396* (G and M); southeastern approaches to Castle Peak, Nevada Co., 31 July, 1903, *Heller 7067* (Phil., M, R. Mt., Stanford, and Pomona); in open gravelly places, Sonora Pass, Tuolumne Co., 9600 ft. alt., 15 Aug., 1915, *A. L. Grant 279* (Cornell, M, Ore., Calif. Acad., and Stanford); Peregoy's, Clark's, etc., 1872, *Gray* (G, TYPE); Mono Trail, 10000 ft. alt., 1866, *Bolander 6016* (U. S.); Beasore Meadow, Madera Co., 7500 ft. alt., 24 June 1918, *A. L. Grant 1311* (Phil., Cornell, M, Calif., and Pomona); above Fresno Dome, Madera Co., 7000 ft. alt., 23 June, 1918, *A. L. Grant 1309a* (M); abundant in open spaces, trail to Nellie Lake, Fresno Co., 8000 ft. alt., 11 July, 1917, *A. L. Grant 1079* (M, G, N. Y., Cornell, U. S., Calif., and Stanford); Huntington Lake, Fresno Co., 7000 ft. alt., 27 July, 1918, *A. L. Grant 1481* (Phil., U. S., Cornell, M, R. Mt., Calif., and Pomona); trail to Mineral King, Upper Kaweah River, Tulare Co., 22 Aug., 1896, *Dudley 1717* (Stanford); Red Lake at foot of Red Mt., Fresno Co., 9000 ft. alt., 2 Aug., 1920, *A. L. Grant 1662a* (Cornell, M, and Pomona); North Fork of King's River, 7000 ft. alt., July, 1900, *Hall & Chandler 429* (M and Stanford); Upper Kaweah River, Tulare Co., 17 Aug., 1896, *Dudley 1663* (Stanford).

There seems to be much confusion as to what is really *M. leptaleus*, since in his description of this species Dr. Gray included what we now recognize as several distinct species. The original description reads "Gravelly soil in the Sierra Nevada, California, at 5000 ft. and upwards, south of the Yosemite, Miss Dix, A. Gray, and in Sierra County, Lemmon." According to our present methods of procedure, Miss Dix's specimen would be the type species, but, on examining the specimens at the Gray Herbarium, we find that Dr. Gray labelled the specimens of Miss Dix's as "Mimulus leptaleus Gray var—" and another specimen of hers from "above Yosemite" is put on a sheet with *M. mephiticus* of Hutching's collection and the whole sheet labelled, in Dr. Gray's handwriting, "M. mephiticus (Eunanus), Syn. Fl. N. Amer." The specimen of Miss Dix's is a larger plant with larger flowers and is undoubtedly *M. mephiticus*, described by Greene in 1885. In view of this, it has seemed advisable to accept Dr. Gray's collection from "Peregoy's, Clark's, etc., 1872," the next specimen cited, as the type.

92. M. Jepsonii Grant[1]

Glandular-pubescent plants; stems 3–8 cm. high, simple or usually more or less branched; leaves mostly basal, oblong, oblanceolate or spatulate, 9–15 mm. long, 2–3 mm. broad, obtuse, tapering to a short slender petiole, 1-nerved, entire, mostly clustered with the flowers toward the tips of the stem and branches; pedicels filiform, 1–2 mm. long; calyx cylindrical, 2–3 mm. long, becoming 4–5 mm. long when mature, teeth triangular, acute to subulate, almost one-third the length of the tube, nearly equal, the throat oblique; corolla bilabiate, reddish-purple, funnelform, 9–10 mm. long, marcescent, becoming filiform, the tube very slender and at least 1½ times as long as the calyx, throat abruptly expanding, slightly bearded below the lower lip, lobes short, truncate, unequal, the upper lip erect and longer than the lower, often with darker blotches down the throat, or with a large yellowish patch spotted with red; upper pair of stamens exserted, anthers glabrous; style exserted, the stigma-lobes about as long as the corolla, subequal, broadly peltate-funnelform; capsule oblong, obtuse, usually slightly exceeding the somewhat distended calyx; seeds faintly reticulate, apiculate at both ends, almost as broad as long.

Distribution: in the mountains of southern Oregon and California.

Specimens examined:

Oregon: Cherry Creek Flat, Klamath Co., 4200 ft. alt., June, 1919, *Rose 1198* (M).

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[1] **Mimulus Jepsonii** Grant, sp. nov., herba glanduloso-pubescens; caulibus 3–8 cm. altis; foliis fere radicalibus, oblongis oblanceolatis, spatulatisve, obtusis, 1-nervatis; calyce 2–3 mm. longo, dentibus fere aequalibus; corolla rubro-purpurea, 9–10 mm. longa, lobis inaequalibus; staminibus glabris; stylo exserto.—Collected at Twin Lakes (Grassy Lake), Lassen Co., 7300 ft. alt., 10 June, 1910, *W. L. Jepson 4112* (Mo. Bot. Gard. Herb., Cornell Univ. Herb., and Univ. Calif. Herb., TYPE).

California: Sierra Co., 1874, *Lemmon* (G and M); Soda Springs, Nevada Co., 7000 ft. alt., 22 July, 1881, *Jones 2459* (G and Stanford); Twin Lakes (Grassy Lake), Lassen Co., 7300 ft. alt., 10 June, 1910, *Jepson 4112* (Calif., TYPE, M, and Cornell).

93. **M. Whitneyi** Gray, Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 445. 1886; Smiley in Univ. Calif. Publ. Bot. **9**: 336. 1921.

Eunanus bicolor Gray in Proc. Am. Acad. **7**: 381. 1867; Greene in Bull. Calif. Acad. Sci. **1**: 103. 1885.

M. nanus var. *bicolor* Gray in Bot. Calif. **1**: 564. 1876; Syn. Fl. N. Am. **2**^{1}: 275. 1878, and ed. 2, 1886.

Small glandular-puberulent plants, 2–4 cm. high, commonly freely branched from the base; leaves entire, elliptical to linear, rarely spatulate, 1–2 cm. long, 1–1.5 mm. broad, acute, tapering to a slender base; flowers numerous, pedicels 1–2 mm. long; calyx campanulate, 3–4 mm. long, teeth unequal, frequently incurved, lanceolate-subulate, about half as long as the tube, throat oblique; corolla funnelform, 1–1.2 cm. long, pubescent externally, marcescent, tube reddish or rarely yellow, slender, at least twice as long as the calyx, throat short, broad, and with few scattered hairs below the lower lip, lobes quadratish, nearly equal, yellow, usually with several broad, club-shaped blotches or lines of reddish-purple down the throat, occasionally the whole corolla reddish-purple or yellow; stamens included, the anthers small, mostly sparingly hispid, filaments of longer pair with retrorse hairs toward the base; style and stigma slightly longer than the upper pair of stamens, stigma-lobes oblong, the lower about half as long as the upper; capsule oblong, obtuse, usually as long as the calyx; seeds smooth, oval, apiculate at both ends.

Distribution: restricted mainly to the high Sierra Nevada Mts. of Fresno and Tulare Counties, California. First collected by Brewer on Lieut. Whitney's Expedition.

Specimens examined:

California: High Sierras, Fresno Co., 1863, *Brewer 2785* (G, TYPE); Markwood Meadow, Fresno Co., 5800 ft. alt., June, 1900, *Hall & Chandler 377* (Calif.); Mt. Silliman, Tulare Co., 10000 ft. alt., 22 Aug., 1905, *K. Brandegee* (G and Calif.); open woods near Old Mt. Whitney, 10000–11000 ft. alt., Aug., 1896, *Purpus 1988, 1989* (Calif.); gravelly soil, Kaweah Meadows, 9400 ft. alt., Aug., 1897, *Purpus 5650* (G and Calif.).

SECTION 6. MIMULASTRUM Gray

§ 6. MIMULASTRUM Gray in Bot. Gaz. **9**: 141. 1884; Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 446. 1886, excl. *M. pictus;* Dalla Torre & Harms, Gen. Siph. 457. 1900–1907.

Eunanus § *Mimulastrum* Greene in Bull. Calif. Acad. Sci. **1**: 105. 1885, excl. *M. pictus.*

Desert annuals; calyx strongly angulate-plicate, the orifice oblique, teeth unequal; corolla salverform, tube short, included, throat exserted, gibbous, lobes nearly equal, rotate with erose margins; stamens approximate in pairs; style puberulent; capsule membranous, dehiscent along the inner suture and part way down the outer suture; placentae separating to the base. Sp. 94.

94. M. mohavensis Lemmon in Bot. Gaz. **9**: 142. 1884; Gray, Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 446. 1886. Pl. 10, fig. 13.

Eunanus mohavensis Greene in Bull. Calif. Acad. Sci. **1**: 106. 1885.

Small profusely branched and leafy plants, 3–15 cm. high; stem and branches dark reddish-purple; leaves reddish-green, elliptical to obovate or oblong, 1–1.8 cm. long, 3–5 mm. broad, acute, entire, sessile, or the lower ones often short-petioled; flowers numerous, mostly alternating in the axils, pedicels slender, 2–3 mm. long; calyx acutely angled, deep reddish-purple, broadly campanulate with spreading teeth, often contracted at the very oblique throat, ciliate, nearly glabrous externally, puberulent on the inside, teeth broadly deltoid, acuminate, the upper tooth 2–4 mm. long, about twice as long and broad as the others, usually recurved; corolla reddish-purple, pubescent externally, tube very short, closely enfolding the ovary, scarious and constricted at the apex, throat cylindrical, exserted less than half its length, gibbous at the base, somewhat contracted at the orifice and with a few long hairs in a patch down the lower side, lobes nearly equal, rotately spreading, 8–12 mm. across, with white, ciliate, more or less erose margins, marked by numerous red branching veins, base deep reddish-purple;

stamens glabrous, included, the style slightly longer, puberulent but not glandular, upper part of ovary slightly puberulent; capsule narrowly lanceolate, included; seeds oval, at least twice as long as broad, apiculate at each end, tuberculate.

Distribution: in small patches on sandy slopes or dry washes along the Mohave River; apparently local in distribution.

Specimens examined:

California: Calico, Mohave Desert, May, 1884, *Lemmon* (Calif.); dry hills at Barstow, 29 May, 1914, *Parish 9243* (Cornell, M., Calif., and Stanford); hills just east of Barstow, May, 1903, *K. Brandegee* (Calif. and Pomona); Barstow, 2100 ft. alt., 22 April, 1914, *Jepson 5823* (Cornell, M, and Calif.); Kane Spring, Ord Mts., 1 May, 1906, *Hall & Chandler 6817* (Calif.).

An interesting desert annual with the calyx and capsule of *M. Bolanderi* but with a wholly different corolla, the latter unlike any other *Mimulus* except *M. pictus.*

SECTION 7. ŒNOE Gray

§ 7. ŒNOE Gray in Benth. Pl. Hartw. 329. 1849, name only; Bot. Calif. **1**: 563. 1876, as to *M. Douglasii, tricolor,* and *latifolius;* Syn. Fl. N. Am. ed. 2, 2^1: Suppl. 443. 1886, as to *M. tricolor, angustatus, Douglasii, atropurpureus, Kelloggii,* and *latifolius;* Wettst. in Engl. & Prantl, Nat. Pflanzenfam. 4^{3b}: 71. 1891; Dalla Torre & Harms, Gen. Siph. 457. 1900–1907.

§ *Eunanus* Benth. ex Gray in Proc. Am. Acad. **11**: 95. 1876, as to *M. tricolor, Douglasii,* and *latifolius;* Greene in Bull. Calif. Acad. Sci. **1**: 96. 1885, as to *E. Kelloggii* and § *Œnoe.*

Low erect annuals, mostly flowering from near the base; leaves entire or obscurely toothed, dark green, frequently red on the lower surface; calyx mostly narrow, plicate, usually scarious below the sinuses, gibbous at base, ribs often reddish, orifice strongly oblique, teeth herbaceous, unequal; corolla marcescent, reddish or rose-purple, tube slender, mostly twice as long as the calyx, throat usually with a few scattered hairs below the lower lip; stamens reddish-purple, inserted in the upper part of the tube, didynamous, the anthers connivent and approximate in pairs forming a cross; style exserted, glandular-pubescent on upper part; stigma reddish-purple, variable; capsule much shorter than the calyx, firm, coriaceous, obtuse, bisulcate, strongly gibbous and oblique at the base, posterior suture usually sharply angled, indehiscent, tardily dehiscent at the apex and along the inner suture, or breaking near the base; placentae separating completely in fruit, the halves adherent to each valve. Sp. 95–104.

KEY TO THE SPECIES

- A. Lower lip of the corolla more than one-third as long as the upper lip.
  - a. Corolla-tube less than twice as long as the calyx.
    - α. Corolla 1.8–2.3 cm. long; lower lip nearly half as long as the upper lip . . . . *95. M. latifolius*
    - β. Corolla less than 1.8 cm. long; lobes subequal.
      - I. Corolla 1.3–1.7 cm. long; capsule lanceolate . . . . *96. M. Congdonii*
      - II. Corolla 6–7 mm. long; capsule broadly oval . . . . *97. M. pygmaeus*
  - b. Corolla-tube at least twice as long as the calyx.
    - α. Corolla-lobes subequal; stigma-lips equal or nearly so; capsule broadly ovate or oblong.
      - I. Calyx-tube puberulent; tube of the corolla 2–3 times longer than the throat . . . . *98. M. tricolor*
      - II. Calyx-tube viscid-villous; tube of the corolla 4–8 times longer than the throat.
        - 1. Lower lip of the corolla reddish-purple . . . . *99. M. angustatus*
        - 2. Lower lip of the corolla wholly or partly yellow . . . . *100. M. pulchellus*
    - β. Corolla-lobes distinctly unequal; stigma-lips manifestly unequal; capsule cylindrical or lanceolate.
      - I. Corolla 1.8–2.8 cm. long; upper lip 4–5 mm. long, less than twice the length of the lower lip; capsule 5–7 mm. long . . . . *101. M. modestus*
      - II. Corolla 4–6 cm. long; upper lip 8–12 mm. long, usually more than twice the length of the lower lip; capsule 9–11 mm. long . . . . *102. M. Kelloggii*
- B. Lower lip of the corolla less than one-third as long as the upper lip.
  - a. Throat of the corolla long and urn-shaped, tube 2–3 times longer than the calyx . . . . *103. M. Douglasii*
  - b. Throat of the corolla funnelform, tube little exserted . . . . . . *104. M. Traskiae*

95. M. latifolius Gray in Proc. Am. Acad. **11**: 95. 1876; Syn. Fl. N. Am. 2^1: 274. 1878, ed. 2, and Suppl. 444. 1886; Curran in Proc. Calif. Acad. Sci. II. **1**: 260. 1888; Conzatti & Smith, Fl. Sin. Mex. 118. 1897.

Eunanus latifolius Greene in Bull. Calif. Acad. Sci. **1**: 99. 1885.

Simple or branched, viscid-pubescent plants; stem with some glandular hairs; leaves numerous on the upper part of the stem, broadly ovate, 1.2–2.5 cm. long, .5–2 cm. broad, acute or obtuse, 5-nerved from the base, short-petioled or sessile; flowers mostly terminal or occasionally solitary in the axils, pedicels very short, 1–2 mm. long; calyx 1–1.3 cm. long, oblong, constricted at the very oblique throat, teeth broadly triangular, obtuse; corolla 1.8–2.3 cm. long, reddish-purple, throat short-funnelform, lower lip about half as long as the erect upper one; stigma-lips very unequal, the upper one ovate-acuminate, the lower hardly more than a scale; capsule 8–10 mm. long, oblong, obtuse, compressed laterally, arcuate, tardily dehiscent at the apex and along the inner suture to the base and less than half way along the outer suture, where it breaks away; seeds broadly ovate, apiculate at both ends, reticulate.

Distribution: in warm, rather moist places on Santa Cruz Island, off the coast of California, and Guadalupe Island, Lower California.

Specimens examined:

California: Santa Cruz Island, 1888, *T. S. Brandegee* (G, Phil., M, and Calif.).

Mexico:

Lower California: Guadalupe Island, 1875, *Edw. Palmer 58* (G, TYPE, N. Y., Phil., and M); Guadalupe Island, April, 1889, *Edw. Palmer 839* (G, U. S., and Calif.); Guadalupe Island, 1885, *Bryant* (Calif.).

M. latifolius and *M. Congdonii* resemble members of the section *Eunanus* in their short corolla-tubes. The structure of the calyx and capsule is that of typical *Œnoe* and they are regarded as transitional species between the two sections.

96. **M. Congdonii** Rob. in Proc. Am. Acad. **26**: 175. 1891.

Eunanus Congdonii Greene in Erythea **1**: 247. 1893.

Eunanus Douglasii var.. *parviflorus* Greene, Manual Bay Region, 276. 1894.

Eunanus Kelloggii var. *parviflorus* (Greene) Jepson, Fl. W. Mid. Calif. 404. 1901.

Subacaulescent with numerous branches from near the base; stem and branches glandular-pubescent; leaves broad, obovate, 1.5–3.5 cm. long, .5–1.5 cm. broad, tapering to a slender ciliated petiole; pedicels stout, 2–4 mm. long; calyx cylindrical, 9–13 mm. long, constricted slightly below the throat, the teeth unequal, short, broad, obtuse, not ciliate; corolla 1.3–1.7 cm. long, rose-pink, tube with scattered glandular-pubescent hairs on the outer surface, slender, little exserted, throat short, not funnelform nor much enlarged, lobes rounded, subequal, and little spreading; longer pair of stamens stout, exserted, very much dilated at the point of insertion, the broad part attached to the tube, shorter pair with very slender filaments and often with aborted anthers; style pale pink, upper lip of stigma ovate, obtuse, lower lip triangular, acute and very short; capsule slender, lanceolate, acute, tardily dehiscent down the inner suture; seeds oblong, apiculate at both ends, scurfy-muriculate with anchor-shaped hairs.

Distribution: foothills of the central Sierra Nevada Mts. and the Coast Range Mts. of California.

Specimens examined:

California: Zimmerman's ranch, Mariposa Co., March, 1887, *Congdon* (Gray, TYPE); Zimmerman's ranch, Mariposa Co., April, 1888, and May, 1888, *Congdon* (G); Stockton Creek, March, 1889, *Congdon* (G); Aqua Fria, Mariposa Co., *Congdon* (G); Mariposa, 25 March, 1892, *Congdon* (Stanford); Stockton Creek, Mariposa Co., 4 April, and May, 1892, *Congdon* (Stanford); Mariposa, 24 March and 7 April, 1896, *Congdon* (Stanford and Pomona); Potter Valley, Mendocino Co., March, *Purpus* (R. Mt.); Cold Creek Cañon, Kelseyville, 30 March, 1904, *Irwin 40* (Calif.).

97. M. pygmaeus Grant[1]

Acaulescent or with stems 4–5 mm. high; leaves basal, linear or spatulate, 3–5 mm. long, 1 mm. broad, obtuse, entire, sparsely glandular-pubescent, tapering to a sessile base; flowers solitary, terminal, pedicels stout, .5–1 mm. long; calyx 3–4 mm. long, cylindrical, sparingly glandular-pubescent, tube constricted below the middle and expanded by the mature capsule, teeth thick, broad, linear, obtuse, very unequal, the upper about one-half as long as the tube; corolla funnelform, 6–7 mm. long, pink, tube exserted, throat slightly expanded, lobes short, broadly truncate, unequal, slightly spreading; stamens glabrous, longer pair exserted, shorter pair with slender filaments and much smaller anthers; style exserted, stigma-lips unequal, upper lobe ovate, obtuse, the lower broad-triangular, acute, and less than half as long; capsule short, broadly oval, mucronately tipped, fully half as long as broad; seeds oblong, apiculate, scurfy-muriculate, without hairs.

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[1] **Mimulus pygmaeus** Grant, sp. nov., acaulescens vel cum caulibus 4–5 mm. longis; foliis radicalibus, linearibus spathulatisve, obtusis, integerrimis, sessilibus; floribus solitariis, terminalibus, pediculis, crassis; calyce 3–4 mm. longo, dentibus latis, valde inaequalibus; corolla rosea, 6–7 mm. longa; capsula late ovata.—Collected at Egg Lake, Modoc Co., California, 8 June, 1894, by *M. S. Baker* and *Frank Nutting* (Univ. Calif. Herb. no. 26888, TYPE).

Distribution: known only from the type locality.

Specimens examined:

California: Egg Lake, Modoc Co., 8 June, 1894, *Baker & Nutting* (Calif., TYPE).

98. **M. tricolor** Lindl. in Hort. Soc. Lond. Jour. **4**: 222. June, 1849; Gray in Proc. Am. Acad. **11**: 95. 1876; Bot. Calif. **1**: 563. 1876; Syn. Fl. N. Am. **2**[1]: 274. 1878, ed. 2, and Suppl. 443. 1886; Jepson, Fl. W. Mid. Calif. 404. 1901, and ed. 2, 377. 1911. Pl. 10, figs. 12, 15.

Eunanus Coulteri Harv. & Gray ex Benth. Pl. Hartw. 329. Aug., 1849; Gray in Pac. Rail. Rept. **4**: 120. 1857.

Eunanus tricolor Greene in Bull. Calif. Acad. Sci. **1**: 99. 1885; Manual Bay Region, 275. 1894.

A short caulescent plant, freely branched from the base; branches glandular-pubescent, erect or spreading, 4–15 cm. long; leaves oblanceolate or oblong, 17–25 mm. long, 4–9 mm. broad, glandular-ciliate, tapering to a slender sessile base; pedicels 2–3 mm. long, stout; calyx campanulate, 1.2–2 cm. long, teeth short, broadly ovate, obtuse, glandular-puberulent; corolla 3–4 cm. long, tube slender, yellow, slightly puberulent, twice as long as the calyx, abruptly expanding to a broad funnelform reddish-purple throat and broad rounded spreading subequal rose-purple lobes, each usually with a large reddish-purple spot near the base, throat marked by a yellow patch dotted with red below the lower lip; anthers hairy; stigma-lips nearly equal, peltate-funnelform, ciliate; capsule short-ovate or oblong, slightly compressed laterally and sharply angled on the sutures, tardily dehiscent; seeds oval, apiculate at both ends, papillate.

Distribution: abundant in late-drying depressions; Oregon, southward through the Sacramento and San Joaquin Valleys and foothills of the Sierra Nevada Mts. of California.

Specimens examined:

Oregon: Pathologium, Corvallis, 30 May, 1915, *Scherer* (Ore.); ploughed field near Corvallis, 31 May, 1892, *Mulford* (G and M); 1 mile west of Corvallis, 8 June, 1912, *Weniger* (Ore.); in field on damp ground, 10 May, 1899, *Getty* (Ore.); golf links, Corvallis, 10 May, 1915, *Otto Elmer* (Ore.); in fields west of Corvallis, 27 May, 1902, *Raber* (Ore.).

California: between Exeter and Kaweah, Tulare Co., 26 April, 1895, *Eastwood* (G); near Suisun, May, 1886, *Greene 10* (Stanford); Live Oaks, San Joaquin Co., March, 1883, *Rattan* (G and Stanford); Live Oaks, San Joaquin Co., April, 1885, *Titus* (Stanford); Hernandez, San Benito Co., 16 May, 1903, *Lathrop* (Stanford); Lewis, Mariposa Co., 17 April, 1892, *Congdon* (Stanford); Stanislaus, 1853–54, *Bigelow* (G); Thalheim, Stanislaus Co., 6 March, 1916, *A. L. Grant 647* (M and Stanford); growing in late drying depressions in stiff clay soil, often coming into flower while still in the water, Elmira, Solano Co., 3 May, 1901, *K. Brandegee 168* (M, R. Mt., Calif., Stanford, and Pomona); Sweeney Creek, Solano Co., 22 April, 1919, *Jepson 8252* (Cornell and Calif.); small colonies on sites of vernal pools, Elmira, Solano Co., 6 May, 1903, *C. F. Baker 2923* (G, M, R. Mt., and Pomona); between Santa Rosa and Sebastopol, 8 June, 1905, *K. Brandegee* (M, R. Mt., and Pomona); near Vacaville, 2–6 May, 1891, *Jepson* (Calif.); low ground, Santa Rosa, Sonoma Co., 27 April, 1918, *Abrams 6901* (Stanford); Burns Valley, Lake Co., May, 1902, *Bowman 2* (Stanford); plains of Sacramento Valley, *Hartweg* (G, *type collection*); Sacramento, 7 April, 1918, *Hannibal* (Stanford); College City, Colusa Co., 6 April, 1915, *Johnson* (Calif.); Clear Creek, Butte Co., 175 ft. alt., 15–30 April, 1897, *H. E. Brown 183* (M, R. Mt., and Stanford); Chico, April, 1885, *Gray* (G); Chico, April, 1899, *Austin 158* (M and Calif.); Chico-Coville Road, 7 miles east of Chico, 24 April, 1914, *Heller 11314* (Cornell and Stanford); fields, Butte Co., May, 1897, *Bruce 2107* (Stanford); near Biggs, Butte Co., 15 May, 1902, *Heller & Brown 5554* (G, M, R. Mt., Stanford, and Pomona); near Madison, Yolo Co., 29 April, 1902, *Heller & Brown 5417* (M, R. Mt., Stanford, and Pomona).

Plants of this species begin to flower when only a half inch or so high, the flowers frequently exceeding the stem in length. The capsules vary decidedly, some being short-ovate while others are oblong.

99. **M. angustatus** Gray, Syn. Fl. N. Am. ed. 2, **2**[1]: Suppl. 443. 1886; Brandegee in Proc. Calif. Acad. Sci. II. **1**: 259. 1888; Jepson, Fl. W. Mid. Calif. 403. 1901, and ed. 2, 377. 1911.

M. Coulteri var. *angustatus* Gray in Proc. Am. Acad. **7**: 38. 1867.

M. tricolor var. *angustatus* Gray in Proc. Am. Acad. **11**: 95. 1876; Bot. Calif. **1**: 563. 1876; Syn. Fl. N. Am. **2**[1]: 274. 1878, and ed. 2, 1886.

Eunanus angustatus Greene in Bull. Calif. Acad. Sci. **1**: 99. 1885; Manual Bay Region, 275. 1894.

M. Clarkii Kell. ex Curran in Proc. Calif. Acad. Sci. **1**: 259. 1888.

Short caulescent plants, 4–5 cm. high; leaves numerous, basal, linear to spatulate, 1–1.5 cm. long, 1–2 mm. broad, glandular-villous to nearly glabrous; calyx 5–7 mm. long, gibbous and contracted over the capsule at maturity, tube viscid-villous, throat oblique, teeth unequal or nearly equal, slightly spreading, broad and obtuse, from one-fourth to one-half the length of the tube; corolla 3–5 cm. long, rose-purple, mostly longer than the stems, tube glandular-pubescent externally, elongated, filiform, 4–8 times the length of the short funnelform throat, lips subequal, upper slightly longer, lower with a large deep crimson spot on each lobe and a yellow patch dotted with red down the throat; anthers hairy, the filaments of the longer pair pubescent; stigma peltate-funnelform with subequal lips; capsule broadly ovate, obtuse, thinner near the base and tardily circumsessile; seeds oblong, favose-pitted.

Distribution: Coast Ranges and foothills of the Sierra Nevada Mts. north and east of San Francisco Bay, California. Commonly coming up in great abundance in drying depressions where the water had been standing in pools.

Specimens examined:

California: Placer Co., *Rattan* (G, TYPE); Long Valley, 1866, *Bolander 4690* (G, U. S., and M); dry run in field, Sherwood Valley, Mendocino Co., 10 June–13 August, 1902, *Jepson 1846* (Calif.); plentiful in open places in the chaparral near Cohasset, Butte Co., 12 April, 1915, *Heller 11806* (Cornell, M, and Stanford); Plumas Co., 1877, *Austin 146* (G); Sierra foothills, Eldorado Co., 22 May, 1903, *Gross 106* (Stanford); Auburn, 1882, *Ames* (Phil.); Amador Co., April, 1886, *T. S. Brandegee* (M, Calif., and Stanford); Amador Co., May, 1886, *Curran 6* (Stanford); Pioneer, Amador Co., 3000 ft. alt., 28 May, 1896, *Hansen 1683* (M and Stanford); Howell Mt., Napa Co., 18 May, 1902, *Tracy 1536* (R. Mt. and Stanford); borders of surface streams, Mt. George, 28 April, 1893, *Jepson* (N. Y. and Calif.); springy place on side of ridge between Pinehurst and Sequoia Lake, Fresno Co., 3 June, 1921, *Ottley 1437* (Wellesley, Cornell, and M).

100. M. pulchellus (Drew) Grant, comb. nov.

Eunanus pulchellus Drew ex Greene, Pittonia **2**: 104. 1890.

M. angustatus Hall, Yosemite Fl. 225. 1912, not Gray.

Dwarfed annuals, 3–6 cm. high, the flowers subsessile and much longer than the stems; leaves clustered thickly at the base, linear or oblanceolate, often spatulate, 1–2 cm. long, entire or obscurely toothed, villous to nearly glabrous; calyx 6–8 mm. long, open, funnelform, tube viscid-villous with an upward appressed pubescence on the inner surface, contracting over the capsule at maturity, teeth broadly triangular, acute or obtuse, spreading, one-fourth to one-half the length of the tube; corolla 2.5–5 cm. long, tricolored, tube long, slender, 4–6 times the length of the short broad dark reddish-purple throat, sparsely pubescent externally, the upper lip reddish-purple and shorter than the wholly or partly yellow lower one, the latter dotted with red; anthers hairy, filaments sparsely pubescent; stigma-lips ciliate, peltate-funnelform, subequal; capsule short, broadly ovate, not compressed, the lower part thinner, breaking away above the base; seeds oblong, favose-pitted.

Distribution: in large patches on moist meadows of the central

Sierra Nevada Mts. from Tuolumne Co. to the Yosemite Valley, California.

Specimens examined:

California: moist meadows near Lake Eleanor, Tuolumne Co., 1890, *Chestnut & Drew* (Calif., *type collection*); Lake Eleanor, 28 June, 1889, *Chestnut & Drew* (Calif.); Saint's Rest on the Mono State Highway, Tuolumne Co., 4000 ft. alt., 10 June, 1917, *A. L. Grant 954* (M); near Confidence, 3000 ft. alt., 14 May, 1916, *A. L. Grant 766* (M, Calif., and Stanford); near Confidence, 10 June, 1917, *A. L. Grant 957* (G, Phil., U. S., M, Ore., Calif., Stanford, and Pomona); Hetch-Hetchy Valley, June, 1900, *Bioletti* (Calif.); Hog Ranch road, near Hetch-Hetchy Valley, 4600 ft. alt., 9 June, 1911, *H. M. Hall 8897* (R. Mt., Calif., and Stanford); Hog Ranch above Hetch-Hetchy Valley, 4700 ft. alt., 14 June, 1917, *A. L. Grant 976* (G, N. Y., Phil., U. S., Calif., Stanford, and Pomona); near Lake Eleanor on Cherry Creek, 4500 ft. alt., 12 June, 1918, *A. L. Grant 1232* (M); Snow Creek, Mariposa Co., 27 May, 1893, *Congdon* (Stanford); Yosemite Valley, May and June, 1900, *Bioletti* (Calif.).

101. M. modestus Eastw. in Zoe **5**: 84. 1900.

M. Congdonii Jepson, Fl. W. Mid. Calif. 404. 1901, and ed. 2, 377. 1911, not Robinson.

Small erect plants, 2–5 cm. high; stem thick, glandular-pubescent, simple or branched from the base; leaves numerous, broadly obovate or spatulate, 1–2 cm. long, 5–8 mm. broad, distinctly 3-nerved, petiole broad, often nearly as long as the blade; pedicels 3–4 mm. long, later reflexed; calyx narrowly tubular, 9–11 mm. long, glandular-pubescent, scarious and slightly gibbous at the base, becoming markedly so at maturity, teeth very short, ovate, obtuse, ciliate; corolla 1.8–2.8 cm. long, rose-purple, tube elongated and slender, pubescent, 4–6 times the length of the broad funnelform dark rose-red throat, lips unequal, the upper less than twice the length of the lower, throat with two yellowish patches below the lower lip, these bordered and streaked with red, limb 8–10 mm. in diameter; stamens unequal, the shorter pair with slender filaments and frequently aborted, the longer pair with broad filaments inflated at the base; style and stigma hardly longer than the upper pair of anthers, lips unequal, the upper one long, ovate-acute, papillate, the lower triangular-acute, almost scale-like; capsule cylindrical, obtuse, 5–7 mm. long, tardily dehiscent down the upper suture; seeds oblong, apiculate at both ends, scurfy-muriculate with anchor-shaped hairs.

Distribution: central Sierra Nevada Mts. and Coast Range Mts., from Shasta Co. to Tulare Co., California.

Specimens examined:

California: Old Bolinas Trail, Mt. Tamalpais, 17 March, 1900, *Eastwood* (Calif. and Calif. Acad., TYPE); near Alpine, on road to Bolinas, Marin Co., 7 April, 1918, *Campbell* (Calif. Acad.); near Rock Spring, Mt. Tamalpais, 12 April, 1918, *A. L. Grant 1208* (M); Lagunitas, 1892, *K. Brandegee* (Calif.); on ridge above Larkspur, Marin Co., 11 March, 1917, *Eastwood* (Calif. Acad.); Ogles, Coast Range, 17 March, 1889, *Fritchey* (M); Milo, Tulare Co., 24 April, 1918, *Goetz 2* (M); Milo, Tulare Co., May, 1918, *Goetz 3* (G, Cornell, N. Y., and M); fields near Springfield, 800–1000 ft. alt., Apr.–Sept., 1897, *Purpus 5011* (M); Deer Trace Hill, opposite Springfield on Tule River, Tulare Co., 26 March, 1897, *Dudley* (Stanford).

This species stands very close to *M. Kelloggii*, but it is smaller in all of its parts. In each one of the corollas of *M. modestus* and *M. Kelloggii* examined, the upper lip of the stigma curved downward and touched the upper pair of anthers. In one bud just ready to open, the stigma was coated with pollen and the open anther-sacs were nearly empty.

102. M. Kelloggii Curran ex Gray, Syn. Fl. N. Am. ed. 2, 2^1: Suppl. 443. 1886; Jepson, Fl. W. Mid. Calif. 404. 1901, and ed. 2, 377. 1911. Pl. 10, figs. 3, 6.

M. Douglasii Gray in Pac. Rail. Rept. **4**: 120. 1857; Proc. Am. Acad. **11**: 95. 1876; Bot. Calif. **1**: 563. 1876; Syn. Fl. N. Am. 2^1: 274. 1878, and ed. 2, 1886, as to description of corolla and fruit.

Eunanus Kelloggii Curran ex Greene in Bull. Calif. Acad. Sci. **1**: 100. 1885.

Eunanus Douglasii Greene, Manual Bay Region, 275. 1894, not Benth.

Stem .5–4 dm. high, glandular-pubescent, simple or usually branched from near the base; leaves broadly rhombic-ovate or oblong, 1.5–5 cm. long, 4–15 mm. broad, obtuse, 3–5-nerved, tapering gradually to a petiole about half as long as the blade; pedicels stout, 6–8 mm. long; calyx narrowly cylindrical, 1.2–2.5 cm. long, densely glandular-pubescent, scarious below the sinuses, slightly gibbous at base, becoming markedly so at maturity, ribs prominent and mostly reddish, teeth short, obtuse, corolla 4–5 cm. long, rose-purple, shaded with darker rose-purple in the throat beneath each lobe, tube nearly glabrous externally, slender, 4–6 times the length of the short funnelform throat, lobes broad, the upper lip erect, 8–12 mm. long, usually more than twice as long as the spreading lower one, limb 1.3–1.5 cm. in diameter, lower part of throat and tube yellow or white dotted with red and with two elongated yellow spots below the lateral lobes of the lower lip; stigma-lips unequal, ciliate, the lower rounded and less than half as long as the oblong acute upper one; capsule slender, almost cylindrical, closely invested by the calyx, 9–11 mm. long, slightly arcuate, usually reflexed when mature, very slowly dehiscent along the upper suture, sometimes rupturing the closely invested calyx; seeds oval, apiculate at both ends, scurfy-muriculate with scattered stipitate anchor-shaped hairs, nearly covered by the thin margins of the placentae.

Distribution: not uncommon in the foothills of northern and central California.

Specimens examined:

California: ridges and meadows near Marble Mountain, Siskiyou Co., 1400 ft. alt., June, 1901, *Chandler* (Stanford); Klamath River, Humboldt Co., 1400 ft. alt., June, 1901, *Chandler 1480* (G and M); Pitt River near Pitt, 28 March, 1913, *L. E. Smith 14* (Calif. Acad.); near Redding, 26 May, 1905, *Heller* (M); Reed Road near Furnaceville, Shasta Co., 2 May, 1900, *M. S. Baker* (Pomona); McCloud's Fork, Shasta Co., 24 April, 1913, *L. E. Smith 116* (Calif. Acad.); Eldorado Co., May, 1884, *Curran* (Stanford); Eldorado Co., 1866, *Rattan* (Stanford); Iron Canyon, Butte Co., May, 1896, *Austin 157* (M); above

Clear Creek on the Paradise Road, Butte Co., 8 May, 1914, *Heller 11374* (M, Calif. Acad., and Stanford); near Clear Creek, Butte Co., 175 ft. alt., 15–30 April, *H. E. Brown 198* (Phil., M, Deam, R. Mt., and Stanford); Berry Canyon, near Clear Creek, Butte Co., 6 May, 1902, *Heller & Brown 5464* (M, R. Mt., Stanford, and Pomona); Little Chico, April, 1897, *Bruce 2102* (Stanford); Chico, without date, *Bidwell* (G); DeSabla, Butte Co., June, 1917, *Edwards* (Stanford); near Bennett Spring, Glenn Co., about 3000 ft. alt., 3 June, 1915, *Heller 11934* (Cornell, M, G, Calif. Acad., and Stanford); Stiver's Ranch near Crane Creek, Tehama Co., 25 April, 1899, *Jepson 63m* (Calif.); Folsom, 1884, *Curran* (G); Sacramento Valley, 1866, *Rattan* (Stanford); near Washington, Nevada Co., 12 June, 1893, *Dudley* (Stanford); Auburn, May, 1886, *Ames 13* (Stanford); rocky gravelly hillsides, Auburn, 1866, *Bolander 4521* (G); Amador Co., May, 1886, *T. S. Brandegee* (M); Agricultural Station, Amador Co., 2000 ft. alt., April, 1893, *Hansen 109*, a depauperate form (M and Stanford); Volcano, Amador Co., 3000 ft. alt., April, 1895, *Hansen 1291* (M and Stanford); Calaveras Co., *Heerman* (Phil. and M); Yankee Hill near Columbia, Tuolumne Co., 8 June, 1915, *Jepson 6398* (Calif.); growing in sandy places along the roadsides, Italian Bar, beyond Columbia, Tuolumne Co., 2000 ft. alt., 14 May, 1915, *A. L. Grant 15* (M, Calif., and Stanford); gravelly hills, Sonora, 12 May, 1854, *Bigelow* (G); near Mark West Springs, Sonoma Co., 25 March, 1902, *Heller & Brown 5146* (M, Stanford, and Pomona); Petrified Forest, 5 June, 1915, *Eastwood 4613* (Calif. Acad.); Lakeport, Lake Co., 20 April, 1917, *Bentley* (Stanford); Mt. St. Helena, 1 May, 1918, *Eastwood 6835* (Calif. Acad.); trail to Caux's cabin, Napa River Basin, 25 April, 1893, *Jepson 28m* (Cornell, R. Mt., and Calif.); western crest of Vaca Mt., 1892, *Jepson 68m* (Calif.); Fremont's Expedition to California, 1846, *Fremont 201* (M); California, Whipple's Exp., 1853–54, *Bigelow* (Phil. and N. Y.).

103. M. Douglasii Gray in Proc. Am. Acad. **11**: 95. 1876, in part; Bot. Calif. **1**: 563. 1876, in part; Syn. Fl. N. Am. 2^1: 274. 1878, ed. 2, 1886, in part, and Suppl. 443. 1886.

M. nanus β *subuniflorus* Hook. & Arn. Bot. Beechey's Voyage, 378. 1840.

Eunanus Douglasii Benth. in DC. Prodr. **10**: 374. 1846; Pl. Hartw. 329. 1849; Greene in Bull. Calif. Acad. Sci. **1**: 98. 1885; Howell, Fl. Northwest Am. 518. 1901, in part.

M. atropurpureus Kell. in Proc. Calif. Acad. Sci. **1**: 59. 1873.

Eunanus subuniflorus Greene, Manual Bay Region, 275. 1894.

M. subuniflorus Jepson, Fl. W. Mid. Calif. 404. 1901, and ed. 2, 377. 1911; Piper, Contr. U. S. Nat. Herb. **11**: 508. 1906.

Short-caulescent plants, 2–6 cm. high; stems erect, viscid or glandular-pubescent; leaves rhombic-ovate or oblong, 1.5–3 cm. long, 6–10 mm. broad, 3–5-veined, hirsute, tapering to a short broad petiole; flowers on short thick pedicels, often longer than the stem; calyx 1–1.4 cm. long, tubular, constricted at the throat, teeth triangular, obtuse, short, ciliate, tube sparingly hirsute; corolla 4–5.5 cm. long, sparsely puberulent on the outer surface, tube white or yellow, slender, 2–3 times the length of the calyx, expanding abruptly to a broad, oblong, urn-shaped throat, rose-purple above and closely streaked with darker rose-purple below, lobes rose-purple, upper lip erect, 7–8 mm. long, lower lip very short, middle lobe 2 mm. long with two yellow patches near the margin, lateral lobes obsolete or nearly so; longer pair of stamens with puberulent filaments; stigma-lips unequal, the upper lip oblong, acuminate, ciliate, the lower triangular, scale-like; capsule ovate, tardily dehiscent down the inner suture; seeds oval, apiculate, scurfy-muriculate.

Distribution: foothills of southern Oregon, southward to central California.

Specimens examined:

Oregon: Roseburg, Umpqua Valley, April, 1887, *Howell 1242* (M and Ore.); Waldo, April, 1892, *Howell 1466* (R. Mt. and Calif.); Merlin, 14 May, 1887, *Henderson 753* (Ore. and Stanford); Corvallis, 14 May, 1887, *Getty* (Ore.); Grant's Pass, 15 April, 1915, *Canby 35* (Ore.); Wimer, 9 April, 1889, *Hammond* (G).

California: Mendocino Co., 1866, *Bolander 4796* (M); gravelly soil where wet in spring, Dinsmore's ranch opposite Buck Mt., Humboldt Co., 2500 ft. alt., 19 June, 1913, *Tracy 4208* (Calif.);

near Clear Creek, Butte Co., 175 ft. alt., 1–15 April, 1897, *Brown 148* (M); Chico, 25 Dec., 1882, *Parry* (M); mesa east of Chico, Feb., 1896, *Austin 227* (M); Chico, 1879, *Bidwell* (G); Eldorado Co., April, 1884, *Curran* (Phil. and Stanford); Sweetwater, April, 1884, *Curran* (G); Auburn, 1878, *Ames* (G); Agricultural Station, Amador Co., 2000 ft. alt., April, 1891, *Hansen 108* (M and Stanford); Amador Co., April, 1889, *Brandegee* (M and Stanford); Table Mt. above Rawhide, Tuolumne Co., 2000 ft. alt., 11–16 April, 1919, *Ferris 1491* (Stanford); in heavy soil, French Flat, Tuolumne Co., 1400 ft. alt., 11–16 April, 1919, *Ferris 1550* (Stanford); Columbia, Tuolumne Co., 31 May, 1915, *Jepson 6335* (Cornell and Calif.); western side of Mariposa Valley, 12 April, 1903, *Congdon* (M); Mariposa, 24 March, 1895, *Congdon* (M); near Milo, Tulare Co., 24 April, 1919, *Goetz 4a* (M); Live Oaks, San Joaquin Co., 15 March, 1886, *Rattan* (Stanford); Live Oaks, March, 1883, *Rattan* (Stanford); near West Point Inn, Mt. Tamalpais, 12 April, 1918, *A. L. Grant 1207* (Cornell, M, and Calif.); southern slopes of Walker Cañon, near Pine Peak, Vaca Mts., 11 March, 1890, *Jepson 61m* (Calif.); Lakeport, Lake Co., 16 May, 1917, *Bentley* (Stanford); top of dry hills, Marin Co., 1860–62, *Brewer 953* (G); bare hill above Mud Lakes, San Mateo Co., 31 March, 1918, *Ferris 758* (Stanford); by cross roads, between Woodside and Crystal Springs Lake, San Mateo Co., 23 March, 1915, *Abrams 5566* (Stanford); foothills near San Mateo, 12 April, 1903, *C. F. Baker 515* (Pomona); Hernandez, San Benito Co., 18 April, 1903, *Lathrop* (Stanford); Monte Bello, Santa Clara Co., 2 April, 1904, *Abrams* (Stanford); summit of the first ridge west of Los Gatos, 25 March, 1904, *Heller 7273* (M and Stanford); open hillsides, head of Stevens Creek, Santa Clara Co., 2 April, 1904, (Stanford); Loma Prieta, Santa Clara Co., 4 April, 1894, *Davy 438* (Calif.); Mt. Hamilton, April, 1903, *Elmer 5049* (Stanford); Santa Lucia Mts., April, 1898, *Plaskett 76* (G); California, *Coulter 636* (G and Phil.); California, *Douglas* (G and N. Y., *type collection*).

The urn-shaped corolla-tube and the nearly obsolete lower lip of the corolla distinguish this species from all of the other *Mimuli*.

104. M. Traskiae Grant in Field Mus. Nat. Hist. Bot. Ser. **5**: 226. 1923.

Stem glandular-pubescent, 10–14 cm. high, simple; leaves few, broadly ovate, 3–4 cm. long, 1–2 cm. broad, entire, nearly glabrous, the lowermost tapering to a short petiole, the upper nearly sessile; pedicels slender, 3–4 mm. long; calyx narrowly oblong, 1.7–2 cm. long, glandular-pubescent, tube membranous, throat spreading, teeth long-ovate, the upper incurved and at least twice the length of the others; corolla 2–2.7 cm. long, reddish-purple and white, tube slender, slightly longer than the uppermost calyx-tooth and 6–8 times as long as the short funnelform throat, lips unequal, the lower reddish-purple with very short rounded lobes, the upper white with broad erect lobes; style slightly exserted, it and the upper pair of stamens villous, stigma-lips unequal, the upper ovate, acute, the lower triangular and less than half as long; capsule 8 mm. long, tardily dehiscent; seeds not seen.

Distribution: known only from the type locality.

Specimens examined:

California: in shade, Avalon, Santa Catalina Island, March, 1901, *B. Trask* (M, no. 99805, TYPE, N. Y., U. S., and Greene).

SECTION 8. PSEUDOENOE Grant

§ 8. PSEUDOENOE Grant, new section

§ *Mimulastrum* Gray, Syn. Fl. N. Am. **2**¹: Suppl. 446. 1886, as to *M. pictus*.

Eunanus § *Mimulastrum* Greene in Bull. Calif. Acad. Sci. **1**: 105. 1885, as to *M. pictus*.

Desert annuals; calyx cylindrical, teeth broad, short, unequal; corolla salverform, tube very short, throat included, cylindrical, gibbous at the base and somewhat contracted at the apex, limb rotately spreading, the lobes reticulately veined with red, unequal; stamens and style included, style glandular-pubescent; stigma-lips unequal, the lower one nearly obsolete; capsule coriaceous or woody, narrowly cylindrical, mucronate, gibbous at the base, readily dehiscent part way along the inner suture and for a short distance along the outer, usually rupturing the closely invested calyx; placentae separating to the base and adherent to each valve. Sp. 105.

105. M. pictus (Curran) Gray, Syn. Fl. N. Am. ed. 2, 2^1: Suppl. 446. 1886.

Eunanus pictus Curran, in herb., ex Greene in Bull. Calif. Acad. Sci. **1**: 106. 1885.

Stem more or less 4-angled, simple or branched from the base, 10–25 cm. high, viscid-pubescent with some glandular hairs; leaves thin, few, obovate to oblong, 1.3–2.3 cm. long, 3–9 mm. broad, obtuse, sessile, entire or often irregularly toothed; flowers few, pedicels stout, 2–3 mm. long; calyx cylindrical, accrescent, 1–1.5 cm. long, 4–5 mm. wide, not constricted at the throat, membranous, reticulately veined, more or less viscid-villous with some glandular hairs, weakly angled, teeth short, broadly triangular, obtuse, the upper not much longer than the others; corolla 10–12 mm. long, scarcely exceeding the calyx, deep reddish-purple, tube 2–3 mm. long, constricted at the top, throat cylindrical, gibbous at the base and with a patch of long hairs on the lower side, orifice slightly constricted, limb rotately spreading, lobes deep reddish-purple at the base, unequal, the lower one larger and hairy, margins white, reticulately veined with red; stamens glabrous, often not approximate in pairs; stigma-lobes unequal, upper oblong, lower almost obsolete; capsule slightly shorter than the calyx; seeds oblong, about twice as long as broad, apiculate at both ends, reticulate.

Distribution: known only from Central California. Mrs. K. Brandegee says that it has the strong tobacco-like odor common in some of the species of the section *Eunanus*.

Specimens examined:

California: Keene Station, June, 1884, *Curran* (Calif., TYPE, and Stanford); Tehachapi, June, 1884, *Curran* (G, Calif., and Stanford); Lindsay, 19 April, 1921, *Ferris* (Calif. Acad.); Porterville, 12 April, 1922, *J. Kelley* (Calif. Acad.).

SECTION 9. TROPANTHUS Grant

§ 9. TROPANTHUS Grant, new section

Glabrous shrubs; leaves pinnately veined, coriaceous, shining, covered with sessile glands; calyx cylindrical, coriaceous, glandular, spirally twisted over the capsule in fruit, teeth equal; corolla bilabiate, tube elongated, ampliate, lobes unequal; anthers glabrous; style pubescent; capsule coriaceous, tardily dehiscent to the base along both sutures, placentae separating completely. Sp. 106.

106. M. Treleasei Grant[1] Pl. 3, fig. 1.

Stem woody, terete, mahogany-colored, glabrous; leaves obovate or elliptical, 2–3 cm. long, 1–1.5 cm. broad, acute, denticulate along upper half, with mucronate teeth, thick, almost coriaceous, glabrous, shining, covered with sessile glands, tapering to a short, narrow petiole, smaller leaves fascicled in the axils; pedicels stout, shorter than the leaves; calyx cylindrical, 1.4–1.5 cm. long, leathery, covered with sessile glands, becoming spirally twisted over the capsule in fruit, teeth ciliate, truncate, tipped with a slender almost subulate point; corolla tubular, 4.2–4.4 cm. long, throat ampliate, tube at least twice as long as the calyx, pubescent externally, lobes short, rounded, slightly erose, ciliate, 8–10 mm. long, lobes of the upper lip longer and broader than those of the lower lip and strongly reflexed, lower lip more or less spreading; stamens exserted, filaments thin, flattened, pubescent, anthers glabrous; style sparingly pubescent, stigma lobes oblong, equal; capsule included, about half as long as the calyx, slightly stipitate, thick, coriaceous, broadly oblong, 7 mm. long, 4 mm. wide, compressed, tardily dehiscent to the base along both sutures; placentae separating completely; seeds oblong, longitudinally wrinkled.

Distribution: known only from the type locality.

Specimens examined:

Puebla: Tehuacan, 2 June, 1905, *Trelease 68* (M, TYPE).

M. Treleasei is a peculiar species, combining the calyx characters of *Eumimulus* with the shrubbiness, the pubescent style, and the separated placentae of *Diplacus.* The capsule is short and broad and apparently does not split the calyx when mature. The spiral twisting of the upper part of the calyx over the mature capsule is unlike that of any other species in the genus. The type sheet contains only two short branches of this unusual plant, and as this is the only material known it has been impossible to tell anything about the size of the plant nor can the color of the flowers be determined.

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[1] **Mimulus Treleasei** Grant, sp. nov., caules lignosi, glabri; foliis obovatis ellipticisve, acutis, denticulatis, dentibus mucronatis, petiolis brevibus, crassis, coriaceis lucidis, cum glandibus sessilibus; pediculis crassis, foliis brevioribus; calyce 1.4–1.5 cm. longo, coriaceo, intorto super capsulam in fructu, dentibus ciliatis, truncatis, mucronatis; corolla tubulata, 4.2–4.4 cm. longa, tubo calyce duplo longiore, lobis brevibus, rotundis, ciliatis; staminibus exsertis, antheris glabris; stylo vix pubescente; capsula coriacea, tarde dehiscente.—Collected at Tehuacan, Mexico, 2 June, 1905, *Wm. Trelease 68* (Mo. Bot. Gard. Herb. 112585, TYPE).

SECTION 10. DIPLACUS Gray

§ 10. DIPLACUS Gray in Proc. Am. Acad. **11**: 97. 1876; Syn. Fl. N. Am. **2**^{1}: 275. 1878, ed. 2, and Suppl. 442. 1886; Bot. Calif. **1**: 565. 1876; Benth. & Hook. Gen. Pl. **2**:. 947. 1876; Wetts. in Engl. & Prantl, Nat. Pflanzenfam. **4**^{3b}: 71. 1891.

Diplacus Nutt. in Taylor's Ann. Nat. Hist. I. **1**: 137. 1838; Nutt. ex Hooker in Curtis, Bot. Mag. II. **12**: under *pl. 3655.* 1838; Benth. in DC. Prodr. **10**: 368. 1846, excl. *D. rugosus;* Greene in Bull. Calif. Acad. Sci. **1**: 94. 1885; Pittonia **2**: 151. 1890; Manual Bay Region, 274. 1894; Jepson, Fl. W. Mid. Calif. 402. 1901, and ed. 2, 375. 1911; Howell, Fl. Northwest Am. 517. 1901; Abrams, Fl. Los Angeles, 363. 1904, and ed. 2, 334. 1917.

Shrubs 6–18 dm. high; leaves thick, firm, usually dark green, mostly revolute in the bud and with compound sessile glands on one or both surfaces; calyx narrow-prismatic or tubular, generally closely adhering to the capsule and ruptured by it in dehiscence, throat oblique, teeth short, unequal; corolla funnelform, yellow, orange, red, or salmon color, mostly distinctly bilabiate with wide open throat and more or less spreading irregular lobes; stamens glabrous, approximate in pairs, unequally inserted, the longer pair inflated at the point of attachment, anthers connivent at apex, glabrous; style glandular-pubescent along the upper half, often thickened at the base when mature; stigma-lips equal or subequal; capsule linear-oblong, firm, coriaceous, commonly dehiscent down the inner suture and held open along the outer one, occasionally dehiscent down both sutures, the broad placentae borne on the valves. Sp. 107–114.

Key to the Species

A. Plants glandular-villous, not glutinous; corolla-lobes nearly equal, margins entire....................................*107. M. Clevelandii*
B. Plants glutinous, with sessile compound glands; corolla bilabiate, lobes unequal, margins erose, irregularly notched or lobed.
  a. Upper part of stem and calyx more or less white-woolly or villous ....*108. M. longiflorus*
  b. Upper part of stem and calyx glabrous or pubescent.
    α. Leaves glabrous on both surfaces.
      I. Corolla 4.5–6.5 cm. long, yellow.
        1. Calyx 2–3 cm. long; stems straw color or gray......*109. M. leptanthus*
        2. Calyx 3–3.5 cm. long; stems yellow....................*110. M. aridus*
      II. Corolla 2.5–4 cm. long, red...................*114. M. parviflorus*
    β. Leaves more or less pubescent on the lower surface.
      I. Leaves densely orange-pubescent beneath; corolla puberulent. ....*111. M. stellatus*
      II. Leaves pale yellowish or brownish-pubescent beneath; corolla mostly glabrous.
        1. Corolla yellow; leaves mostly densely pubescent beneath ....*112. M. aurantiacus*
        2. Corolla red; leaves mostly sparsely pubescent below....*113. M. puniceus*

107. M. Clevelandii Brandg. in Garden and Forest **8**: 134, *fig. 20.* 1895.

Diplacus Clevelandii Greene in Erythea **4**: 22. 1896.

Suffrutescent, freely branched at the base, 3–6 dm. high; stems villous-pubescent with numerous glandular hairs but not glutinous; leaves oblong or lanceolate, 2.5–10.5 cm. long, 1–2.5 cm. broad, acute, tapering to a broad sessile base, entire or usually serrate along upper half, hispid, margins sometimes revolute; pedicels slender, 2 mm. long, flowers few, confined to the upper part of the stem and branches; calyx campanulate, 2.5–2.7 cm. long, glandular-pubescent externally, pubescent on the inner surface, tube narrow and constricted above the ovary, upper half spreading to an ampliate oblique throat, teeth unequal, lanceolate, obtuse, about one-third the length of the calyx; corolla 3.6–4 cm. long, golden-yellow, tube pubescent, included, expanding gradually to a broad funnelform throat, lobes rounded, entire, little spreading, nearly equal; stamens included, filaments puberulent at the base, attached to the lower part of the tube; style included, densely puberulent, slightly swollen at the base; stigma peltate-funnelform with rounded nearly equal lips;

capsule 1 cm. long, ovate-oblong, tapering slightly to the tip; seeds elliptical, apiculate at each end, muriculate.

Distribution: collected only in southern California.

Specimens examined:

California: frequent along trail on high ridge, Glen Ivy to Santiago Peak, Riverside Co., 4000 ft. alt., 14 June, 1923, *Munz 7062* (Pomona); south side of Cuyamaca Peak, San Diego Co., 6000 ft. alt., 7 July, 1894, *T. S. Brandegee* (G, U. S., Calif., TYPE, Stanford, and Pomona); Cuyamaca Mts., June, 1895, *T. S. Brandegee* (N. Y.); High Mt., near Descanso, San Diego Co., 24 May, 1906, *T. S. Brandegee* (F); Descanso Grade, San Diego Co., June, 1906, *K. Brandegee* (Pomona).

An unusual species combining characters of the sections *Diplacus* and *Eunanus*. T. S. Brandegee says that it grows in patches, spreading by underground roots.

108. M. longiflorus (Nutt.) Grant in Gentes Herb. **1**: 136. 1923. Pl. 10, fig. 2.

Diplacus longiflorus Nutt. in Taylor's Ann. Nat. Hist. I. **1**: 139. 1838, by error published as *D. longiflora;* Nutt. ex Hooker in Curtis, Bot. Mag. II. **12**: under *pl. 3655*. 1838; Benth. in DC. Prodr. **10**: 368. 1846; Greene, Pittonia **2**: 156. 1890, not Bull. Calif. Acad. Sci. **1**: 96. 1885; Davy in Gard. Chron. III. **16**: 20. 1894; Abrams, Fl. Los Angeles, 364. 1904, and ed. 2, 334. 1917.

M. glutinosus var. *brachypus* Gray in Proc. Am. Acad. **11**: 97. 1876; Bot. Calif. **1**: 566. 1876; Syn. Fl. N. Am. **2**^{1}: 276. 1878, ed. 2, and Suppl. 442. 1886.

Diplacus arachnoideus Greene in Bull. Calif. Acad. Sci. **1**: 210. 1885.

Diplacus speciosus Davy in Erythea **2**: 101. 1894; Davy in Gard. Chron. III. **16**: 20. 1894.

A profusely branched shrub, 3–9 dm. high; stem and branches densely pubescent with short scattered glandular hairs; leaves lanceolate to linear-lanceolate or oblong, 3–8 cm. long, .5–1.5 cm. broad, obtuse, entire or occasionally toothed along the upper half, tapering to a sessile base, yellowish-green, nearly glabrous above, usually pubescent beneath with branched or unbranched hairs, the pubescence more or less deciduous, smaller leaves frequently fascicled in the axils, lower leaves sometimes petiolate; pedicels 3–10 mm. long, and, as well as the younger parts of the stem, branches, and calyces, usually densely villous and glandular-pubescent; calyx 2.5–3.5 cm. long, slender below, constricted near the middle and then expanding abruptly to a long wide throat, teeth narrow, obtuse, ciliate, the longest 7–10 mm. long; corolla 4.5–7 cm. long, cream-color to salmon-yellow, tube usually narrow and distinctly exserted, throat broad, gibbous at the base, funnelform, lobes .8–1.5 cm. long, broadly rounded or truncate, irregularly cut, erose or wavy, upper lip nearly erect, lower spreading and somewhat longer; stamens included, attached near the top of the tube; style slightly exserted, slender and usually enlarged at the base when mature; stigma-lips subequal, broadly ovate, ciliate, densely pubescent on the inner surface; capsule linear-oblong; seeds oblong, apiculate at both ends, muriculate.

Distribution: common in the foothills throughout the coast region of southern California and southward into Lower California.

Specimens examined:

California: dry rocky places, Palo Santo, San Luis Obispo Co., *Brewer 586* (G); Blochman's Ranch, Santa Maria, 17 June, 1906, *Eastwood 461* (Calif. Acad.); Sisquoc River, Santa Barbara Co., July, 1895, *M. S. Baker* (Stanford); near lake, Zaca Lake Forest Reserve, Santa Barbara Co., 19 June, 1906, *Eastwood 543* (Calif. Acad.); state highway between Santa Inez Mission and Gaviota Pass, Santa Barbara Co., 10 June, 1917, *Abrams 6529* (Stanford); Gaviota Pass, Santa Barbara Co., 19 July, 1913, *Abrams 5033* (M, Stanford, and Pomona); La Cumbre Trail, Santa Inez Mts., 28 Aug., 1909, *Abrams 4321* (Stanford); Santa Cruz Island, 16–17 July, 1917, *Eastwood 6388* (Calif. Acad.); Santa Cruz Island, 6 June, 1918, *Miller* (Calif. Acad.); San Ysidro ranch, Aug., 1913, *Newell* (Calif. Acad.); Santa Barbara, 25 April, 1913, *G. B. Grant* (Stanford); Santa Barbara hills, 400 ft. alt., 14 May, 1907, *H. M. Hall 7739* (M); Mission Cañon, Santa Barbara, 21 April, 1908, *Eastwood 19* (M); Santa Barbara, 13 July, 1880, *Earle* (M); Santa Barbara, May, 1902, *Elmer 3959* (M and Stanford);

Santa Barbara, May, 1889, *K. Brandegee* (M); at junction of Rattlesnake Cañon Road, Santa Barbara, 23 May, 1911, *Nichols 905* (Stanford); Eucalyptus Drive, Santa Barbara, 23 May, 1911, *Nichols 907* (Stanford); Sycamore Cañon, Santa Barbara, 23 May, 1911, *Nichols 908* (Stanford); Santa Barbara, 1885, *Gray* (G); Casitas Pass, Ventura Co., 500 ft. alt., 6–8 May, 1902, *H. M. Hall 3160* (Stanford and Pomona); La Casitas, 24 July, 1911, *Nichols 1013, 1014, 1016, 1017* (Stanford); dry rocks, Ojai Valley, 8 April, 1888, *Batchelder* (G); Nordhoff, Ventura Co., 12 April, 1916, *Eastwood 4960* (Calif. Acad.); Saticoy, 17 April, 1916, *Eastwood 5051* (Calif. Acad.); Conejo Grade, Ventura Co., 10 July, 1923, *Wilkinson 1* (Cornell); Sulphur Mt. Spring, Ventura Co., 1000–2000 ft. alt., 12 June, 1908, *Abrams & McGregor 55* (Stanford and Pomona); Mt. Lowe, 19 July, 1915, *Drushel* (Drushel); Mt. Wilson, 19 July, 1915, *Drushel* (M and Drushel); Wilson's Peak, 1 Aug., 1890, *I. M. Johnston* (Pomona); mts. near Claremont, 15 May, 1909, *C. F. Baker 5320* (Stanford and Pomona); Topango Cañon, Santa Monica Mts., 3 June, 1916, *Hiatt* (M and Pomona); Santa Monica Forestry Station, summer of 1897, *Barber 298* (M); Santa Monica Mts., 1000 ft. alt., 15 May, 1920, *Munz & Harwood 4010* (M and Pomona); Sepulveda Cañon, Santa Monica Mts., 15 June, 1902, *Abrams 2543* (M and Stanford); La Crescenta, *Wislizenus 1291*, in part (M); cañons, Los Angeles, June, 1888, *Hasse* (M); stony hillsides, Lone Hill, Glendora, 11 April, 1918, *Munz 2033* (Pomona); Altadena, 24 May, 1904, *G. B. Grant 286* (M); Russell's Lake, Los Angeles Co., 18 July, 1913, *Abrams 5020* (Stanford and Pomona); Lone Hill near San Dimas, Los Angeles Co., 19 April, 1919, *Parish 19264* (M); dry ground under pines, North Fork San Antonio Cañon, 7500 ft. alt., 28 July, 1917, *I. M. Johnston 1607* (Stanford and Pomona); on a rock slide, San Antonio Mts., 5500 ft. alt., 16 June, 1918, *Parish 11987* (M); Cañon Diablo, San Bernardino Mts., 2000 ft. alt., 8 June, 1917, *Parish 11346* (M and Pomona); Johnson's Pastures, 15 May, 1916, *Robinson* (Pomona); Arrowhead Springs, San Bernardino Mts., 13 May, 1891, *Fritchey 6* (M); Arrowhead Hot Springs, 21–28 May, 1906, *G. B. Grant* (Stanford); vicinity of San Bernardino, 1000–2500 ft. alt., 26 June, 1897, *Parish 4468* (G, M, and Calif.); foothills, San Bernardino Co., May, 1888, *Parish* (M); vicinity of San Bernardino, 1000–2500 ft. alt., 18 May, 1901, *Parish 4792* (Stanford); southern California, 1876, *Parry & Lemmon 311* (M).

Mexico:

Lower California: Santa Tomas hills, northern Lower California, 17 May, 1886, *Orcutt* (M); near San Rafael, northern Lower California, 11 July, 1885, *Orcutt 1295* (G and M); All Saints Bay, 16 May, 1885, *Greene* (G and Stanford).

108a. Var. **calycinus** (Eastw.) Grant, comb. nov.

Diplacus calycinus Eastw. in Bot. Gaz. **41**: 287. 1908.

Stems numerous, irregularly branched, light brown or straw-colored, upper part densely woolly; leaves obovate or oblong, obtuse, 2–6 cm. long, 3–23 mm. wide; pedicels and calyces densely viscid-woolly with long white, mostly unbranched hairs, tube constricted near the center, often breaking at or near the constriction; capsule about half as long as the calyx.

Distribution: southern part of the Sierra Nevada Mts., California.

Specimens examined:

California: rocks near Springfield, 1000–2000 ft. alt., April–Sept., 1897, *Purpus 5621* (G and M); rocks, Granite Basin, Kern River Region, 16 July, 1895, *Dudley 750* (Stanford); South Fork of Kaweah River, Tulare Co., 6000 ft. alt., 22 July, 1904, *Culbertson 4407*, distributed by *C. F. Baker* (G, M, Calif. Acad., TYPE, and Pomona); Kern River Road between Bakersfield and Bodfish, Digger Pine Belt, 29 July, 1915, *Abrams 5350* (Stanford); cañon sides from Lemon Cove to Three Rivers, about 1000 ft. alt., *Jepson 593* (Calif.); Tehipite Valley, Fresno Co., 4000 ft. alt., 6–10 July, 1900, *Hall & Chandler 511* (N. Y. and M); South Fork Kaweah, Clough Cave Ford, 19 June, 1902, *Dudley* (Stanford); Rowen, Tehachapi Mts., 14 April, 1916, *Jepson 6741* (Calif.); Tehachapi, May, 1889, *K. Brandegee* (G, M, and Stanford); Erskin Creek, 2000–3000 ft. alt., 1897, *Purpus 5338* (M); Kern Canyon, Kern Co., 26 April, 1905, *Heller 7771* (G, Phil., M, and Stanford); Simpson Meadow, Middle Fork King's River, July, 1913, *Eliot* (Calif.); Middle Tule River, 2500 ft. alt., 26 June, 1912, *Jepson 4862* (Cornell and Calif.).

Much confusion has been caused by the large number of intermediates between *M. longiflorus* and *M. puniceus.* That the plants hybridize has been demonstrated by experimental work already discussed. These intermediates can easily be separated into four groups, of which the following two agree closely with known hybrids.

108b. M. longiflorus × M. puniceus

Stems densely glandular-pubescent; leaves oblong or lanceolate, obtuse, pubescent below; calyx 2–2.5 cm. long, puberulent, often viscid-villous at the base, the upper part not widely inflated; corolla 3.5–5 cm. long, dark red, lobes .5–1 cm. long, truncate, crenate.

Distribution: southern California from Los Angeles Co. to San Diego Co.

Specimens examined:

California: Butte, west of Lakeview, 8 May, 1920, *I. M. Johnston 2286, 2288, 2295* (M and Pomona); Puddington Cañon, 5 April, 1919, *Munz, Street & Williams 2447* (Pomona); near Murietta, Santa Ana Mts., 1500 ft. alt., 29 March, 1920, *Robinson & Crocker* (Pomona); vicinity of Riverside, 21 April, 1902, *H. M. Hall 2928* (M and Pomona); rocky hill near Moreno, Riverside Co., 17 Jan., 1920, *Barrus & Reed 115* (Cornell); mountain side at Rainbow, San Diego Co., 21 March, 1920, *Barrus & Whetzel 209a* (Cornell); Botanical Garden, University of California, 1 June, 1918, *A. L. Grant 1618* (Cornell and M).

The corolla of this hybrid is similar to that of *M. puniceus,* except that it is longer and has a broader limb. The upper half of the calyx is inflated, resembling that of *M. longiflorus.*

108c. M. longiflorus × M. puniceus.

Calyx glandular-pubescent, more or less viscid-villous on the lower part, not expanded above the middle; corolla 4–5.5 cm. long, salmon color, limb 2.5–3 cm. wide.

Distribution: southern California from Los Angeles Co. to San Diego Co.

Specimens examined:

California: San Jose Hills, 3 miles west of Pomona, 1000 ft. alt., 13 March, 1920, *Munz & Harwood 3356, 3339* (M and Pomona); Butte, due west of Lakeview, 2000 ft. alt., 8 May, 1920, *I. M. Johnston 2280, 2281, 2283, 2284, 2289, 2292, 2293, 2297* (M and Pomona); hills near Ysidora, San Diego Co., 22 April, 1903, *Abrams 3286* (G and M); San Diego, 1874, *Cleveland* (M); Pala Mission, San Diego Co., 12 April, 1920, *Jepson 8493* (Calif.); Botanical Garden, University of California, 1 June, 1918, *A. L. Grant 1619* (G, Cornell, M, and Pomona).

The flowers of this hybrid seem to be intermediate between the two parents. The calyx is of the general shape of that of *M. puniceus* whereas the corolla is similar to that of *M. longiflorus*, except in regard to color. The amount of hairiness varies, but in general it is intermediate between the two parents.

It is probable that the plants of the two other groups are also of hybrid origin, but further experimental work will have to be done to determine their exact status. Until such studies are made, it seems advisable to give the members of these two groups varietal names.

108d. Var. rutilus Grant[1]

Stem, branches, calyces, and the short pedicels densely glandular-villous; leaves numerous, narrowly oblong to broadly lanceolate, obtuse, dentate, dark green, villous at the base, pubescent on the lower surface; corolla 4.5–5.5 cm. long, dark velvety-red, varying to salmon-red, tube as long as the calyx, throat ventricose, lobes .8–1.5 cm. long, broad, truncate, irregularly cut; stamens short, included in the lower part of the throat; style included; stigma-lips subequal, the longer ovate-obtuse, the shorter deltoid; capsule almost as long as the calyx and with no tubercular enlargement at the apex.

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[1] **Mimulus longiflorus** var. **rutilus** Grant, var. nov., caulis, rami, calyces et breves pediculis dense glanduloso-villosi; corolla rutila; staminibus brevibus, inclusis; stylo incluso.—Collected at Santa Susanna Pass, Ventura Co., 10 June, 1920, *Adele Lewis Grant 1650* (Gray Herb., U. S. Nat. Herb., Phil. Acad. Nat. Sci. Herb., N. Y. Bot. Gard. Herb., Cornell Univ. Herb., Mo. Bot. Gard. Herb., no. 894182, TYPE, Rocky Mt. Herb., Calif. Acad. Sci. Herb., Univ. Calif. Herb., Stanford Univ. Herb., and Pomona Coll. Herb.).

Distribution: foothills in Ventura Co. and Los Angeles Co., California.

Specimens examined:

California: Santa Susanna Pass, Ventura Co., 10 June, 1920, *A. L. Grant 1650* (G, U. S., Phil., N. Y., Cornell, M, TYPE, R. Mt., Calif. Acad., Calif., Stanford, and Pomona); Santa Susanna Mts., Feb., 1861, *Brewer 208* (G and U. S.); hills near Chatsworth Park, 3 April, 1917, *F. Grinnell, Jr.* (Pomona); Lone Hill near San Dimas Cañon, 1100 ft. alt., 17 March, 1920, *Munz 3362* (M and Pomona); Lone Hill near San Dimas, Los Angeles Co., 19 April, 1919, *Parish 19266* (M); Griffith Park, 11 June, 1902, *Braunton 472* (U. S.); San Antonio Cañon, Claremont, 23 May, 1909, *C. F. Baker 5354* (Pomona).

108e. Var. **linearis** (Benth.) Grant, comb. nov.

M. linearis Benth. Scroph. Ind. 27. 1835; Walp. Rep. **3**: 274. 1844–45.

Diplacus linearis Greene, Pittonia **2**: 156. 1890.

M. glutinosus var. *linearis* Gray in Proc. Am. Acad. **11**: 97. 1876; Syn. Fl. N. Am. **2**^{1}: 275. 1878, ed. 2, and Suppl. 442. 1886.

Diplacus leptanthus Benth. in DC. Prodr. **10**: 368. 1846, not Nuttall.

Calyx 2.5–2.8 cm. long, glandular-puberulent, not widened much in the upper part, more or less glandular-villous below, especially when in bud; corolla 4–5.5 cm. long with a wide limb, similar to that of *M. longiflorus*.

Distribution: southern California from Ventura Co. to San Diego Co.

Specimens examined:

California: canyon near Murietta, Santa Ana Mts., 29 March, 1916, *Robinson & Crocker* (M); Butte, due west of Lakeview, 2000 ft. alt., 8 May, 1920, *I. M. Johnston 2282, 2285, 2290, 2291, 2294, 2296* (M); Whittier, 18 March, 1920, *C. O. Smith 208* (Cornell); San Diego Co., May, 1889, *K. Brandegee* (M); Laguna, between Campbell's and Cameron's ranches, 21

June, 1894, *Mearns 3659* (G); near Alpine, San Diego Co., 10 July, 1912, *Abrams 4900* (G); hills near Ysidora, San Diego Co., 23 April, 1903, *Abrams 3287* (M); hills between Campo and Potrero, San Diego Co., 3 June, 1903, *Abrams 3716* (M); San Pasqual Grade, San Diego Co., 12 April, 1920, *Jepson 8504* (Calif.); California, without date, *Douglas* (G and N. Y., probably part of the type).

109. M. leptanthus (Nutt.) Grant in Gentes Herb. **1**: 136. 1923.

Diplacus leptanthus Nutt. in Taylor's Ann. Nat. Hist. I. **1**: 138. 1838, by error published as *D. leptantha;* Nutt. ex Hooker in Curtis, Bot. Mag. II. **12**: under *pl. 3655.* 1838.

Diplacus grandiflorus Grönl. in Paris Rev. Hort. IV. **6**: 402, *fig. 136.* 1857; Planchon in Fl. des Serres **9**: *pl. 883.* 1853–54; Greene, Pittonia **2**: 156. 1890.

Diplacus glutinosus var. *grandiflorus* Lindl. in Paxt. Fl. Gard. **3**: *pl. 92.* 1851–53.

Diplacus longiflorus Greene in Bull. Calif. Acad. Sci. **1**: 96. 1885, mainly, not Nuttall.

Stem and branches slender, puberulent; leaves numerous, oblong to spatulate, 2.5–5 cm. long, .7–1.4 cm. broad, rounded at apex or merely obtuse, tapering to a slender, sessile base, glabrous, shining as though varnished but not glandular, entire or slightly toothed, frequently revolute, smaller leaves often fascicled in the axils, lower leaves occasionally petioled; pedicels slender, puberulent, .6–1.5 cm. long; calyx tubular, 2–3 cm. long, slender, nearly glabrous, teeth triangular, acute, about one-fourth as long as the calyx, ciliate; corolla 4.5–6.5 cm. long, yellow, tube very slender, exserted, expanding abruptly to a long wide throat, lobes deeply cut, broad, emarginate, often with a spread of 3 cm.; stamens included; style slender, somewhat exserted, sometimes with a slight enlargement at the base; stigma-lips equal, ovate, rounded; capsule short; seeds oblong, apiculate at both ends, papillate.

Distribution: foothills of the Sierra Nevada and Coast Range Mts., California.

Specimens examined:

California: Belden, Plumas Co., 18 June, 1910, *Jepson 4150* (Calif.); American River Mills, Plumas Co., May, 1874, *Ames* (G); Emigrant Gap, July, 1916, *Herbrand* (Cornell and Calif.); Emigrant Gap, 28 June, 1882, *Jones 3288* (M, Pomona, and Calif. Acad.); De Sabla, 6 June, 1917, *Edwards* (Stanford); American River, May, 1912, *von Geldern* (Calif. Acad.); Bear Valley above Towles, July, 1894, *Brier* (Calif.); rocks by South Yuba River, Nevada Co., 14 June, 1893, *Dudley* (Stanford); Nevada City, May, 1902, *Kitts* (G and U. S.); between Chico and Forest Ranch, 18 May, 1914, *Heller 11407* (G, Cornell, M, Stanford, and Calif.); Butte Co., June, 1897, *Austin* (G); hills east of Chico, May, 1896, *Austin* (M); Sierra's, without date, *Bolander & Kellogg* (Stanford); Upper Sacramento, *Stillman* (G); Placer Co., 1893, *Hardy* (U. S.); Tassajara Hot Springs, Monterey Co., June, 1901, *Elmer 3367* (M and Stanford); Tassajara Springs, Santa Lucia Mts., June, 1901, *Dudley* (Stanford); Big Sur River, Monterey Co., July, 1897, *Bolton* (Pomona); Fremont's Expedition to California, 1846, *Fremont 510* (G and M); Saw Mill to Nacimiento River, 14–20 June, 1901, *Jepson 1691* (Calif.); Nacimiento River, Santa Lucia Mts., Monterey Co., 1–12 May, 1897, *Eastwood* (G); Nacimiento Creek, Monterey Co., 3 April, 1901, *Dudley* (Stanford); Carmel Camp near Carmel River, Monterey Co., 25 June, 1905, *Dudley* (Stanford); San Antonio Creek above the Mission, Santa Lucia Mts., 13 May, 1895, *Dudley* (Stanford); States Hot Springs, Monterey Co., July, 1918, *Reynolds* (Calif. Acad.); near Bentley's Orchard, Santa Lucia Mts., 3000 ft. alt., Aug., 1914, *MacDougal* (Stanford); Santa Lucia Mts., April, 1898, *Plaskett 122* (G and Greene).

110. M. aridus (Abrams) Grant, comb. nov.

Diplacus aridus Abrams in Bull. Torr. Bot. Club **32**: 540. 1905.

A low glabrous glutinous shrub, 2–4 dm. high; leaves oblanceolate, obovate or oblong, 2–4 cm. long, 4–10 mm. broad, entire or irregularly dentate, numerous, crowded together on the short yellow stem and branches, short-petioled or sessile, pale yellow-green, smaller leaves usually revolute; flowers numerous; pedicels stout, 5–6 mm. long; calyx 3–3.5 cm. long, funnelform with a narrow tube and a wide spreading throat, teeth short, broadly triangular, subulate, unequal, the longest tooth 7–8 mm. long; corolla 4.5–5.5 cm. long, pale buff to yellow, tube glabrous, little exserted, expanding abruptly to an open throat, almost as wide as long, lobes short, rounded and slightly notched; stamens exserted; style slightly puberulent, exserted, not swollen at the base, stigma-lips ovate, acute, nearly equal, ciliate; capsule 1.5 cm. long; seeds oval, apiculate at both ends, muriculate.

Distribution: known only from the southwestern part of San Diego Co., California.

Specimens examined:

California: dry ridges, Jacumba, 31 May, 1903, *Abrams 3656* (N. Y., TYPE, G, M, Stanford, and Pomona); El Cajon, San Diego Co., Aug., 1889, *Orcutt* (M).

111. **M. stellatus** (Kell.) Grant, comb. nov.

Diplacus stellatus Kell. in Proc. Calif. Acad. Sci. **2**: 18. 1863, and **2**: 210. 1885; Greene in Bull. Calif. Acad. Sci. **1**: 95. 1885.

Diplacus glutinosus var. *stellatus* (Kell.) Greene, Pittonia **2**: 155. 1890.

A scraggly freely branching shrub, the young stem and branches densely covered with deep-yellow tomentum; leaves numerous, ovate-lanceolate to linear, 2–4.5 cm. long, .3–1.2 cm. wide, obtuse, entire or occasionally denticulate, tapering to a broad sessile base, revolute, thick, glabrous and shining above, densely orange-pubescent below with branched hairs; pedicels stout, 6–7 mm. long; calyx narrow, tubular, 2–2.2 cm. long, glabrous or sometimes puberulent, very glutinous, little or not inflated above, teeth linear, obtuse, ciliate, the longest 5–6 mm. long; corolla 3.5–3.8 mm. long, yellow, puberulent externally, tube slender, included, throat funnelform, lobes narrow, 3–5 mm. long, rounded, not erose; stamens unequally inserted near the top of the tube, longer pair exserted; style exserted, swollen at the base; capsule included; seeds oblong, apiculate at each end, faintly reticulate.

Distribution: known only from Cedros Island, off the coast of Lower California.

Specimens examined:

Lower California: Cedros Island, May, 1885, *Greene* (G, M, and

Stanford); Cedros Island, May, 1881, *Belding* (G); Cedros Island, 18–20 March, 1889, *Edw. Palmer 728* (G); Cedros Island, July–Oct., 1896, *Anthony 47* (G and Stanford); Cedros Island, 1 April, 1897, *T. S. Brandegee* (U. S. and M); Cedros Island, without date, *Veatch* (G, *type collection*).

Dr. Kellogg and Dr. Greene were much confused regarding this species; Dr. Kellogg gave it its specific name because of certain stellate hairs which were found on the pedicels and on the lower surface of the leaves. Later, it was found that these hairs belonged to another plant which grew near the *Mimulus*. *D. stellatus* was accordingly reduced to synonymy under *Mimulus* by Dr. Gray and to a variety of *Diplacus glutinosus* by Dr. Greene. The dense orange-yellow pubescence, though, is characteristic of the plant and differentiates it from the other members of the section. This and its small corolla with an unusually narrow funnelform throat and short lobes seem to warrant its being retained as a valid species.

112. M. aurantiacus Curt. in Bot. Mag. I. **10:** *pl. 354.* 1796.

M. glutinosus Wendl. Bot. Beobacht. 51. 1798; Jacq. Hort. Schoenbr. **3:** *pl. 364.* 1798; Willd. Sp. Pl. **3:** 361. 1800; Benth. Scroph. Ind. 28. 1835; Hook. & Arn. Bot. Beechey's Voyage. 154. 1841; Gray in Bot. Calif. **1:** 565. 1876; Syn. Fl. N. Am, **2**^{1}**:** 275. 1878, ed. 2, and Suppl. 442. 1886. Pl. 10, figs. 5, 14.

M. viscosus Moench, Meth., Suppl. 168. 1802.

Diplacus glutinosus Nutt. in Taylor's Ann. Nat. Hist. I. **1:** 138. 1838, by error published as *D. glutinosa;* Nutt. ex Hooker in Curtis, Bot. Mag. II. **12:** under *pl. 3655.* 1838; Benth. in DC. Prodr. **10:** 368. 1846; Greene in Bull. Calif. Acad. Sci. **1:** 95. 1885; Pittonia **2:** 154. 1890; Manual Bay Region, 274. 1894; Howell, Fl. Northwest Am. 518. 1901; Jepson, Fl. W. Mid. Calif. 402. 1901, and ed. 2, 376. 1911.

Diplacus aurantius Sweet, Hort. Brit. ed. 2, 516. 1839.

Diplacus latifolius Nutt. in Taylor's Ann. Nat. Hist. I. **1:** 138. 1838, by error published as *D. latifolia;* Nutt. ex Hooker in Curtis, Bot. Mag. II. **12:** under *pl. 3655.* 1838; Greene in Bull. Calif. Acad. Sci. **1:** 95. 1885.

Diplacus glutinosus var. *aurantiacus* (Curt.) Lindl. in Paxt. Fl.

Gard. **3**: under *pl. 92*. 1851–53; Planchon in Fl. des Serres **9**: under *pl. 883*. 1853–54.

Diplacus glutinosus var. *latifolius* Greene, Pittonia **2**: 155. 1890.

A profusely branched scraggly shrub, 6–12 dm. high; upper part of stem yellowish, puberulent or pubescent, often with some short glandular hairs; leaves sessile, oblong to lanceolate or linear, 2.5–5 cm. long, 4–14 mm. broad, entire, few-toothed or sometimes serrate, revolute, dark green, glabrous and shining above, covered with numerous small compound sessile glands, paler and usually with a dense branched pubescence beneath, smaller leaves often fascicled in the axils; pedicels mostly shorter than the calyx, .4–1 cm. long, glandular-pubescent; calyx narrow, 2–2.8 cm. long, 3–5 mm. broad, tubular, not constricted at the center and little or not at all inflated at the orifice, glabrous or sometimes puberulent, rarely pubescent, sometimes hispid at the sinuses, teeth triangular, obtuse, 2–5 mm. long, covered with sessile glands; corolla 3.5–4 cm. long, yellow, tube mostly included, sometimes slightly puberulent externally, enlarging gradually to a wide funnelform throat, lobes spreading, unequal, mostly truncate, sometimes emarginate or erose; stamens slightly exserted; style-base enlarged in maturity, stigma-lips rounded, ciliate, usually exserted; capsule about as long as the calyx; seeds long-oblong, apiculate at both ends, papillose.

Distribution: common in the foothills of the Sierra Nevada and Coast Range Mts., from southern Oregon to Santa Barbara Co., California.

Specimens examined:

Oregon: Brookings, Curry Co., May, 1915, *Thompson 116* (Stanford); open bluff above beach, Brookings, 11 July, 1919, *Peck 8786* (M).

California: Fort Bragg, Mendocino Co., 8–16 Aug., 1912, *Eastwood 1676* (Calif.); Fort Bragg, 1914, *Mathews 30* (Calif.); Big River, Mendocino Co., June, 1903, *McMurphy 294* (Stanford); Mendocino, May, 1896, *H. E. Brown, 703, 834* (M); Carlotta, Humboldt Co., June, 1915, *Hawver* (Calif. Acad.); Trinidad, Humboldt Co., 21 April, 1907, *Eastwood 6* (Calif. Acad.); Eureka, 28 April, 1918, *Paulson* (Stanford); Trinidad, 18 July, 1916, *Abrams 6141* (Stanford); Fortuna, Humboldt Co., 18 July, 1916, *Abrams 6072* (Stanford); Bartlett Springs, *McCallum* (Calif. Acad.); banks of Smith River, 21 April, 1892, *Howell 1454* (M); Smith River, Del Norte Co., June, 1884, *Howell* (G); near American Lower Bridge at Folsom, 7 April, 1916, *Heller 12305* (M, Stanford, and Calif. Acad.); 4 miles above Folsom, 14 April, 1918, *Hannibal* (Stanford); between Folsom and Auburn, 27 April, 1918, *Hannibal* (Stanford); Petaluma, 14 June, 1895, *Tidestrom* (Pomona); Lakeport, Lake Co., 28 March, 1917, *Bentley* (Stanford); Gates Canyon, near Vacaville, 27 April, 1902, *Heller & Brown 5388* (Cornell, M, Stanford, and Pomona); Vaca Valley, 1877, *Rattan* (Stanford); near St. Helena Sanitarium, 2 July, 1916, *Abrams 5769* (Stanford); Petrified Forest, Sonoma Co., 3 July, 1916, *Abrams 5780* (Stanford); Bodega Bay, Sonoma Co., 11 April, 1902, *Heller & Brown 5258* (M); vicinity of Ione, Amador Co., 200–500 ft. alt., July, 1904, *Braunton 1146* (M); Comanche, 300 ft. alt., April, 1895, *Hansen 1052* (M); White Bar, 1000 ft. alt., April, 1895, *Hansen 1051* (M); Plymouth, Amador Co., 1 June, 1903, *Gross 79* (Stanford); Mokelumne Hill, 1300 ft. alt., May, 1895, *Blaisdell* (Calif. Acad.); near Rawhide, Tuolumne Co., 13 Aug., 1915, *Stinchfield 81* (Stanford); Kentfield, Marin Co., 20 May, 1912, *Eastwood 66* (Calif. Acad.); Sausalito, 12 Aug., 1872, *Redfield 6093* (M); Lone Mt., San Francisco, 1877, *Rattan* (Stanford); Sunnyside, San Francisco, 1892, *Cannon* (Calif. Acad.); San Francisco, *Bolander 0/4* (M); sand dunes, San Francisco, 5 June, 1893, *Davy 196* (M); San Mateo, 21 April, 1894, *Burnham* (Pomona); East Oakland hills, July, 1899, *Carruth* (Calif. Acad.); Berkeley, 1891, *Greene* (Stanford); Cedar Mt., Alameda Co., May, 1903, *Elmer 4355* (M); Sunol Valley, Alameda Co., 29 June, 1916, *Abrams 5682* (Stanford); Mocho Creek, Alameda Co., May, 1903, *Elmer 4355* (Stanford, Calif. Acad., and Pomona); Mt. Diablo, near lake, 30 June, 1916, *Abrams 5704* (Stanford); Mt. Diablo, 30 May, 1915, *Eastwood 4455* (Calif. Acad.); San Leandro, 21 June, 1915, *Eastwood 4737* (Calif. Acad.); Belmont, 6 May, 1911, *Nichols 1006* (Stanford); Templeton, 1 July, 1911, *Thompson 1001, 1002* (Stanford); Congress Springs, 29 April, 1911, *Nichols 831*

(Stanford); Stanford University, 17 April, 1902, *Abrams 2346* (Stanford and M); Page Mill Road, foothills near Stanford University, 23 April, 1904, *Anthony* (Stanford); Stanford University, May, 1902, *Dudley* (Stanford); foothills near Stanford University, 2 March, 1902, *C. F. Baker 280* (M and Pomona); foothills west of Los Gatos, 25 May, 1904, *Heller 7449* (M and Stanford); Saratoga, Big Basin Road, 23 June, 1915, *Abrams 5257* (Stanford); King's Mt., Santa Cruz Mts., 20 May, 1906, *McMurphy 25* (M); Santa Cruz, 16 June, 1903, *Thompson* (M); Glenwood, Santa Cruz Co., 1914, *Davis* (Calif. Acad.); Pt. Pinos, Monterey, 30 May, 1912, *Eastwood 185* (Calif. Acad.); Pacific Grove, 17 June, 1916, *McGregor 66* (Stanford); hard road bed, Pacific Grove, 5 Nov., 1911, *Nichols 1008* (Stanford); in pine woods, Huckleberry Hill, near Pacific Grove, 30 Sept., 1905, *Dudley* (Stanford); woods near Pacific Grove, 12 June, 1907, *Patterson & Wiltz* (Stanford); open pine forest, Pacific Grove, Aug., 1917, *Parish 11502* (M); in pine woods, Pacific Grove, 14 April, 1903, *Heller 6580* (M, Stanford, and Pomona); Pacific Grove, June, 1903, *Elmer 4377* (M, Stanford, and Pomona); Carmel Valley, 25 June, 1905, *Dudley* (Stanford); on north side of Carmel Valley, 1 June, 1916, *Abrams 5631* (Stanford); Coast Trail, Monterey Co., 17 Aug., 1903, *Dudley* (Stanford); Santa Margarita Mts., on road to San Luis Obispo, 3 April, 1903, *Dudley* (Stanford); Cuesta Grade, San Luis Obispo Co., 20 July, 1913, *Abrams 5042* (Stanford); Haynes Ranch, San Luis Obispo Co., July, 1912, *Ingalls* (Calif. Acad.); San Luis Obispo Hot Springs, 10 June, 1917, *Abrams 6509* (Stanford); Pismo, San Luis Obispo Co., 1 April, 1911, *Dice* (Stanford); Suey Creek, Santa Maria, 15 June, 1916, *Eastwood 433* (Calif. Acad.); Gaviota Pass, Santa Barbara Co., 11 June, 1917, *Abrams 6540* (Stanford); Fremont's Expedition to California, 1846, *Fremont 509* (M).

M. aurantiacus, being the earliest published name, has undoubted priority and therefore must be substituted for the well-known name of *M. glutinosus*. This species is found north of the northern part of Santa Barbara Co., whereas *M. longiflorus* to which it is closely related, is mostly confined to the southern part of the state. A few specimens seem to suggest an intermediate condition, and it is possible that they hybridize where they meet. *Diplacus latifolius* Nutt. is a broad-leaved form of *M. aurantiacus*. A pubescent form has been collected by *Abrams 6467, 6468, 6469,* and *6470* and by *Dudley* on the road between Jolon and King's City in central California. In these specimens, the stem, branches, pedicels, and calyces are densely pubescent.

113. M. puniceus (Nutt.) Steud. Nom. Bot. ed. 2, pt. 2, 150. 1841; Gray, Syn. Fl. N. Am. ed. 2, **2**^{1}: Suppl. 442. 1886.

Pl. 10, fig. 11.

Diplacus puniceus Nutt. in Taylor's Ann. Nat. Hist. I. **1**: 137. Apr., 1838, by error published as *D. punicea;* Nutt. ex Hooker in Curtis, Bot. Mag. II. **12**: under *pl. 3655.* May, 1838; Maund's Botanist **4**: *pl. 169.* 1840; P. N. Don in Donn's Hort. Cantab. ed. 13, 402. 1845; Greene in Bull. Calif. Acad. Sci. **1**: 96. 1885; Pittonia **2**: 157. 1890; Abrams, Fl. Los Angeles, 364. 1904, and ed. 2, 334. 1917.

Diplacus glutinosus var. *puniceus* Benth. in DC. Prodr. **10**: 368. 1846.

M. glutinosus var. *puniceus* Gray in Bot. Calif. **1**: 566. 1876; Syn. Fl. N. Am. **2**^{1}: 275. 1878, and ed. 2, 1886.

A freely branched glutinous shrub, 5–18 dm. high; stem and branches terete, glabrous or puberulent; leaves thick, linear or narrowly lanceolate, occasionally oblanceolate, 2–6 cm. long, 3–11 mm. broad, mostly obtuse, usually sessile and partly clasping the stem, entire or sometimes denticulate, generally revolute, dark green and glabrous above, paler and with scattered branched hairs on the lower surface, smaller leaves often fascicled in the axils; pedicels 6–12 mm. long; calyx narrow, tubular, 1.8–2.5 cm. long, glabrous, throat scarcely dilated, teeth triangular, obtuse or acute, often ciliate, unequal, upper tooth 5–7 mm. long; corolla 3.5–4 cm. long, dark red to brick-red, tube included, throat ample, funnelform, lobes narrow, truncate, emarginate or the lateral lobes irregularly notched; stamens inserted on the upper part of the tube, longer pair sometimes puberulent, usually slightly exserted; style exserted, puberulent above, slightly thickened at the base at maturity; stigma-lips equal; capsule cylindrical, obtuse, nearly as long as the calyx; seeds elliptical, acute at both ends, papillate.

Distribution: common on dry hillsides from Los Angeles Co. to northern Lower California.

Specimens examined:

California: Avalon, Santa Catalina Island, 13 June, 1915, *Carlson* (G); Santa Catalina Island, 22 April, 1904, *G. B. Grant 285* (M and Deam); Santa Catalina Island, 20–25 July, 1917, *Eastwood 6502* (Calif. Acad.); Avalon, Santa Catalina Island, Aug., 1896, *Trask* (M); Avalon, Santa Catalina Island, 8 April, 1901, *G. B. Grant 3753* (Stanford); Catalina Island, 23 July, 1915, *Drushel* (M and Drushel); Encinitas, May, 1894, *Angier 34* (M); moist hillsides, Laguna Cañon, 26 July, 1916, *Crawford* (M and Pomona); La Crescenta, *Wislizenus 1291*, in part (M); dry hillsides, Temecula, 27 April, 1918, *Munz 2145* (Pomona); Butte, west of Lakeview, 2000 ft. alt., 8 May, 1920, *I. M. Johnston 2284, 2298* (M and Pomona); Miller's Canyon, Murietta, 28 March, 1916, *Robinson* (Pomona); Sierra Canyon, Santa Ana Mts., 1200 ft. alt., 24 April, 1920, *Munz & Harwood 3758* (M and Pomona); Mission Hills, San Diego, 9 May, 1903, *Abrams 3440* (M and Stanford); near Fallbrook, San Diego Co., 750 ft. alt., 17 May, 1920, *Munz & Harwood 3853, 3854* (M and Pomona); along north hillsides, San Diego, 10 June, 1902, *T. S. Brandegee 1640*, distributed as *C. F. Baker 1640* (M and Pomona); Elsinore, 4 April, 1904, *C. F. Baker 4152* (M, Stanford, Calif. Acad., and Pomona); dry hillsides, San Luis Valley, 5 May, 1917, *Street* (Pomona); hills near Ysidora, San Diego Co., 23 April, 1903, *Abrams 3285* (M and Stanford); chaparral, Howard Canyon, La Jolla, 7 Mar., 1914, *Clements & Clements 122* (M); Del Mar, 9 June, 1901, *Jepson 1604a* (Calif.); near San Diego, May, 1889, *T. S. Brandegee* (G and M); San Diego, 1850, *Parry* (M); San Diego, 1875, *Edw. Palmer 283* (M); San Diego, 1879, *Orcutt 131* (M); in canyons near San Diego, 400 ft. alt., 11 June, 1920, *Spencer 1617* (Pomona); Sweetwater Dam, 20 April, 1895, *Fritchey* (M); Geological Survey of California, 1860–1861, *Cooper* (G and U. S.); San Clemente Island, June, 1903, *Trask 267* (U. S., a thin and broad-leaved form); San Clemente Island, 10 April, 1923, *Munz 6707* (Pomona, similar to the above); San Diego, without date, *Nuttall* (G, TYPE).

Mexico:

Lower California: northern Lower California, 23 June, 1885, *Orcutt 1295* (Gray Herb.).

114. M. parviflorus (Greene) Grant, comb. nov.

Diplacus parviflorus Greene, Pittonia **1**: 36. 1887; *ibid.* **2**: 157. 1890; Davy in Gard. Chron. III. **16**: 20. 1894.

A very leafy shrub, glabrous or nearly so, 1.5–6 dm. high; leaves obovate or rhombic-ovate, 2–4.5 cm. long, .5–2 cm. broad, obtuse, narrowed to a slender sessile base, entire or irregularly dentate, occasionally revolute, paler green on lower surface and often shining as though varnished; flowers numerous, pedicels mostly as long as the calyx, slender; calyx tubular, 1.7–2.2 cm. long, slightly spreading at the throat, covered with sessile glands, these giving it a shiny appearance, teeth short, triangular, obtuse, upper one 4–6 mm. long; corolla 2.5–4 cm. long, brick-red, tinged with yellow on lower lip and down the throat, tube slender, included, expanding abruptly to the long, somewhat tubular throat, lobes short, truncate, little spreading, scarcely erose, upper lip 5–6 mm. long, lower lip shorter, limb 1–1.5 cm. in diameter; stamens exserted, upper pair often as long as the corolla; style and stigma reddish-yellow, exserted, sometimes with a slight tubercular enlargement at the base; stigma-lips ciliate, sometimes fimbriate; capsule 1.5–2 cm. long; seeds oval, apiculate at each end, reticulate.

Distribution: common on Santa Cruz Island off the coast of Santa Barbara, California.

Specimens examined:

California: Island of Santa Cruz, July and August, 1886, *Greene* (M, Phil., and Stanford); Santa Cruz Island, April, 1888, *T. S. Brandegee* (G); East End Mt., Santa Cruz Island, July, 1901, *Snodgrass* (Stanford); Friar's Harbor, Santa Cruz Island, 3 Sept., 1903, *J. Grinnell 7* (Stanford); Santa Cruz Island, 16–17 July, 1917, *Eastwood 6397* (G and Calif. Acad.); Santa Cruz Island, 24 May, 1918, *Miller* (Calif. Acad.); Valdez Harbor, Santa Cruz Island, Aug., 1923, *A. L. Grant 1696* (M and Calif.).

Dr. Greene reports that these plants "flower profusely at a height of only three or four inches."

An interesting plant, closely related to *M. parviflorus*, has been collected on Santa Cruz Island by *Mrs. C. E. Miller* and *A. L. Grant 1703* and *1704*. A single specimen first came to the author's notice in a collection of *Mimulus* borrowed from the California Academy of Science. In July, 1923, there was an opportunity to go to Santa Cruz Island to look for this plant. It was found to be fairly common on the open hillsides near Friar's Harbor and Valdez, occurring, however, only where *M. parviflorus* and *M. longiflorus* grew near each other. The color varied from the deep red of *M. parviflorus* to the clear yellow of *M. longiflorus*. The shape and size of the calyx and corolla and the leaf characters exhibited all possible combinations of the characters of the two above-mentioned species, so it seemed probable that the plants under consideration were natural hybrids. Typical material of *M. parviflorus* was found to be abundant in the canyons, whereas typical *M. longiflorus* occurred only on the open hillsides. Crosses are being made between these several plants, and it is hoped to obtain experimental proof of the parentage of the apparent hybrid.

DOUBTFUL AND LITTLE-KNOWN SPECIES

M. albus Dougl. Jour. 150. 1914.

Stem 10–15 cm. high; leaves sessile, linear-lanceolate, minutely dentate; flowers small, white, tube yellow.

Collected by Douglas on the shores of the Columbia River. This probably is an albino form of *M. breviflorus* or of one of the species closely allied to it.

M. glandulosus Lehm. Del. Sem. Hort. Hamb. 7. 1830; Linnaea **6**: Litt. 11. 1831; Walp. Rep. **3**: 276. 1844–45.

A glandular-pubescent annual with procumbent stems; leaves broadly ovate, dentate, pale green; pedicels shorter than the leaves; flowers small.

Indigenous to North America. It evidently is closely related to *M. glabratus* and may be a pubescent form of that species.

M. lanatus Dougl. Jour. 122. 1914; Loudon in Hort. Brit. 251. 1839, not Pursh (inadequately described).

A woolly perennial with creeping roots; leaves nearly sessile, ovate-lanceolate; flowers large, yellow.

Collected by Douglas on moist rocks on the Multnomah and Columbia Rivers at the falls of both.

M. orizabae Benth. in DC. Prodr. **10:** 372. 1846.

Pubescent; leaves subcordate-ovate, about 2.5 cm. long, serrate, sparsely hirtellous, petiolate; pedicels longer than the leaves; calyx-teeth broadly lanceolate, the upper larger; corolla twice as long as the calyx.

Collected on Mt. Orizaba in Mexico.

M. pteropus Raf. Fl. Ludov. 44. 1817.

The brief description corresponds closely with some of the short-petioled specimens of *M. alatus*. Rafinesque says, however, that it "is not the *M. alatus* which has winged stems and sessile flowers."

M. Pissisi Phil. in Anal. Univ. Chile **18:** 57. 1861; Linnaea **33:** 212. 1864–65.

M. depressus var. *Pissisi* (Phil.) Reiche, Fl. Chile **6^1:** 62. 1911.

Glabrous; stems creeping, very short, stoloniferous; leaves crowded, sessile, triangular-ovate, 1 5 cm. long, 1.2 cm. broad, coarsely and doubly dentate, sometimes dotted with red; flowers subsessile; calyx-teeth broad; corolla 2.6 cm. long, not spotted; style as long as the corolla.

Four specimens of this species were collected by Volkmann at Huanta in the Province of Coquimbo, Chile, at 4000 ft. alt. It may be conspecific with *M. luteus*.

M. punctatus Miers ex Bert. in Merc. Chile, 700. 1829; Am. Jour. Sci. **23:** 254. 1833.

A species imperfectly described and possibly a synonym of one of the varieties of *M. luteus*. It has large yellow flowers with red spots.

M. Neubertii Hge. & Schm. ex Wettst. in Engl. & Prantl, Nat. Pflanzenfam. **4^{3b}:** 72. 1891, *nomen nudum*.

Mimulus quinquevulnerus is the French florist's name for *M. luteus*, fide Morren in Belg. Hort. **20:** 177. 1870.

HYBRIDS

Mimulus was very popular in horticulture during the middle part of the nineteenth century. The ease with which hybrids could be obtained and the great variety of color-forms which resulted made it a desirable group for experimental purposes. The most common parents were *M. luteus* and its varieties *rivularis* and *variegatus* of the section *Simiolus, M. cardinalis* and *M. Lewisii* of the sections *Erythranthe* and *Paradanthus*, and *M. glutinosus* and *M. puniceus* of the section *Diplacus*. Numerous hybrids were produced and these were crossed and recrossed, so that it is impossible to tell the parentage of most of the present garden forms. It is interesting to note that no hybrids were recorded from crosses made between members of the section *Diplacus* and any other section. The following is a list of the more common hybrids which have been described and pictured in various floral magazines. Many of them are still being cultivated.

M. cornation Rivoire in Rev. Hort. **93**: 355. 1921.
Corolla velvety-red, throat yellow. Derived from *M. cupreus*.

M. Bartonianus Rivoire in Rev. Hort. **93**: 356. 1921.
Flowers rose-red, throat yellow spotted with brownish-red. Hybrid between *M. cardinalis* and *M. Lewisii*.

M. duplex Hort. ex Wettst. in Engl. & Prantl, Nat. Pflanzenfam. 4^{3b}: 72. 1891.

M. Elphinstonea in Fl. Mag. **4**: 144. 1836.
The colored plate shows the plant to have yellow corollas, each lobe of which is deeply edged with crimson. Parentage not given.

M. Forsythiana in Fl. Mag. **3**: 216. 1835.
Flowers pale-sulphur with rosy-crimson spots. This hybrid was raised by J. Forsyth, of Anlaby, near Hull. Parentage not given.

M. Harrisonia Paxt. in Paxton's Mag. Bot. **4**: 173. 1838.
Corolla reddish-pink with lines of reddish-brown spots down the throat below each lobe, lobes not reflexed. This is a hybrid between *M. cardinalis* and *M. roseus*.

M. hybridus Hort. ex Wettst. in Engl. & Prantl, Nat. Pflanzenfam. 4^{3b}: 72. 1891.

M. luteus var. **calycanthemus** Morr. in Belg. Hort. **20**: 177. *pl. 9.* 1870.

This is a double form with the calyx similar to the corolla. Flowers yellow streaked and spotted with red. According to Morren it appeared spontaneously on a plant which was the result of a cross between *M. cupreus* and *M. trigridioides.*

M. luteus var. **pardinus** Morr. in Belg. Hort. **17**: 77. 1867.

This is another one of the forms with double flowers. It was received by Benary at Erfurt and was called by him *M. tigrinus* var. *duplicis.* It is descended from seed of *M. maculosus* which was the result of a cross between *M. cupreus* and a hybrid of *M. luteus* under the name of "Gaiety."

M. luteus var. **Wilsoni** D. Don in Brit. Fl. Gard. *pl. 406.* 1838; Paxt. Mag. Bot. **4**: 260. 1838.

Corolla yellow with numerous dark fulvous-red spots. This is said to have been raised by Miss Wilson from seeds of *M. luteus.*

M. Maclainianus (Hook.) Paxt. in Mag. Bot. **9**: *pl. 147.* 1842.

M. roseus var. *Maclainianus* Hook. in Bot. Mag. *pl. 3924.* 1842; Paxt. Mag. Bot. **9**: 46. 1842.

Resembles *M. cardinalis* closely in the shape of the flower. Corolla deep crimson with a deep blood-red center. This is a hybrid between *M. roseus* and *M. cardinalis.*

M. maculatus Paxt. in Paxt. Mag. Bot. **4**: 119. 1838.

Corolla yellow with spots of delicate pink color. Parentage not given.

M. maculosus in Gartenfl. **13**: 153. 1846.

Corolla large and variously spotted and lined. Hybrid between *M. luteus* or some of its hybrids and *M. cupreus.*

M. rubiginosus Morr. in Belg. Hort. **10**: 268. 1860.

Said to be similar to *M. quinquevulnerus,* which was the French florist's name for *M. luteus.*

M. sanguineus Paxt. in Paxt. Mag. Bot. **4**: 119. 1838.

Corolla red. Parentage not given.

M. Seymouriana Paxt. in Paxt. Mag. Bot. **9:** 118. 1842.

Corolla large, the lobes marked with blotches or bands of brown around a yellow center, these bands being stained or clouded with a darker color. Parentage not given.

M. Smithii Paxt. in Paxt. Mag. Bot. **1:** *pl. 54.* 1834; Bot. Reg. *pl. 1674.* 1835.

Leaves large, covered with white glandular hairs; pedicels about three times as long as the calyx; corolla yellow with a single large reddish-brown spot near the tip of each petal, throat dotted with red. This is a cross between *M. luteus* var. *rivularis* and *M. variegatus.*

M. tigridioides Hort.

This is a garden name for many of the numerous color forms resulting from various crosses, mostly between *M. luteus* or its varieties and *M. cupreus.*

M. Youngii Hort. Angl. ex Steud. Nom. ed. 2, 150. 1841.

Diplacus Godroni Versch. ex Morr. in Belg. Hort. **13:** 4. 1863.

D. glutinosus var. *Godroni* Lem. in L'Illust. Hort. **10:** *pl. 359, fig. 1.* 1863.

Flowers large, corolla dark red, throat and base of lobes yellow, lobes fringed. This is the result of a cross between *D. aurantiacus* and *puniceus* with *D. glutinosus,* according to the authors.

Diplacus splendidus Versch. ex Morr. in Belg. Hort. **13:** 5. 1863.

D. glutinosus var. *splendidus* Lem. L'Illust. Hort. **10:** *pl. 359, fig. 3.* 1863.

Flowers large, corolla dark red, throat and tube yellow, lobes dark red, emarginate. This is the result of the same cross as the above.

Diplacus Verschaffeltii Versch. ex Morr. in Belg. Hort. **13:** 5. 1863.

D. glutinosus var. *Verschaffeltii* Lem. in L'Illust. Hort. **10:** *pl. 359, fig. 2.* 1863.

Flowers smaller than in either of the above, corolla deeper red, tube yellow, throat yellow with two white ridges below the middle lobe, lobes more narrow, margin irregular but not incised nor fringed. This is the result of the same cross as the above.

FOSSIL SPECIES

M. saxorum Cockerell in Am. Mus. Nat. Hist. Bull. **24:** 107. *pl. 10, fig. 47.* 1908.

Pedicels 6.5 mm. long; calyx 18 mm. long, teeth sharply pointed, upper and lower teeth 6 mm. long, lateral teeth 5 mm. long.

This is a well-preserved specimen from the Tertiary and was discovered in Colorado. Cockerell says that it has a calyx formed "approximately as in *M. guttatus.*" In that species, however, the teeth are broadly rounded and the upper one is two to three times as long as the others. The fossil calyx seems to be more nearly related to *Tropanthus* or to *Eumimulus.*

EXCLUDED SPECIES

Mimulus Alecterolophus Scop. Fl. Carn. ed. 2, **1:** 435. 1772 = RHINANTHUS CRISTA-GALLI L.

Mimulus Crista-galli Scop. Fl. Carn. ed. 2, **1:** 434. 1772 = RHINANTHUS CRISTA-GALLI L.

Mimulus exilis Dur. & Hilg. in Pac. Rail. Rept. **5:** 12. *pl. 12.* 1855 = MIMETANTHE PILOSA (Benth.) Greene.

Mimulus hirsutus Blume, Bijdr. 756. 1825–26 = TORENIA FLAVA Buch.-Ham.

Mimulus javanicus Blume, Cat. Hort. Buitenz. 83. 1823 = VANDELLIA CRUSTACEA Benth.

Mimulus perfoliatus HBK. Nov. Gen. & Sp. **2:** 371. 1817 = LEUCOCARPUS ALATUS D. Don.

Mimulus pilosus Wats. in Bot. King's Exp. 225. 1871 = MIMETANTHE PILOSA (Benth.) Greene.

Mimulus radicans Hook. f., Fl. N. Zeal. **1:** 188. 1853–55 = MAZUS RADICANS (Hook. f.) Cheesm.

Mimulus violaceus Blanco in Fl. Filip. ed. 2, 357. 1845 = VANDELLIA MOLLIS Benth.

Diplacus rugosus Benth. in DC. Prodr. **10:** 368. 1846 = BERENDTIA RUGOSA (Benth.) Gray.

LIST OF EXSICCATAE

The distribution numbers are printed in *italics*. Unnumbered collections are indicated by a dash. The number in parentheses is the species number used in this monograph.

Abrams, L. R. *813, 1442, 2422, 3877* M. guttatus (14); *1279, 3531, 3597* M. brevipes (70); *1379, 3596* M. Fremontii (77); *1873, 2611, 4380, 4627* M. floribundus (44); *1892, 2588* M. Bigelovii (74); *2346, 5042, 5257, 5631, 5682, 5704, 5780, 6072, 6141, 6509, 6540* M. aurantiacus (112); *2370* M. guttatus var. arvensis (14e); *2543, 4321, 5020, 5033, 6529* M. longiflorus (108), *5350* var. calycinus (108a), *3286* hybrid (108c), *3287, 3716, 4900* var. linearis (108e); *2612, 3538* M. nasutus (17); *2616, 5017, 5485* M. cardinalis (6); *2800, 5836, 6107* M. moschatus var. sessilifolius (46b), *4464* var. longiflorus (46a); *2813, 4571* M. primuloides (54); *3440, 3285* M. puniceus (113); M. aridus (110); *4485* M. laciniatus (18); *4584, 4694* M. Layneae (82); *4695* M. mephiticus (88); *4726* M. Bolanderi (71); *4780* M. Breweri (67); *4932* M. subsecundus var. viscidus (78a); *4950* M. Lewisii (52); —, *5566* M. Douglasii (103); *6901* M. tricolor (98).

Abrams, L. R., & McGregor, E. A. *55* M. longiflorus (108); *99* M. Fremontii (77); *464* M. Bigelovii (74); *530* M. cardinalis (6); *559* M. Parishii (51); *648* M. moschatus var. longiflorus (46a).

Aguiel, Bro. *10254* M. glabratus var. Fremontii (25a).

Aiton, — M. moschatus (46).

Allen, O. D. *72* M. Tilingi var. caespitosus (13a); *276* M. Lewisii (52).

Ames, Alma, *18* M. guttatus (14); *19* M. moschatus var. longiflorus (46a).

Ames, Mrs. M. E. P. — M. angustatus (99); — M. bicolor (55); — M. Douglasii (103); *13* M. Kelloggii (102); *21* M. Pulsiferae (40).

Anderson, C. L. — M. Bolanderi var. brachydontus (71a); —, *73* M. montioides (65).

Anderson, J. P. — M. ringens (1); — M. guttatus (14).

Andrews, D. M. *8* M. Tilingi (13).

Angier, B. S. *33* M. brevipes (70); *34* M. puniceus (113); *192* M. guttatus (14).

Anthony, A. W. *39* M. cardinalis (6); *47* M. stellatus (111).

Anthony, G. — M. aurantiacus (112).

Applegate, E. I. — M. brevipes (70).

Arimoto, — M. nepalensis (35).

Arsène, Bro. — M. glabratus (25), *5310, 9936* var. Fremontii (25a).

Ashcroft, G. B. — M. alatus (2).

Atkinson, W. A. — M. aurantiacus (112).

Austin, Mrs. R. M. *16* M. Austinae (84); *85, 1543* M. guttatus var. depauperatus (14b); *146* M. angustatus (99); *147*, —, *395* M. moschatus var. longiflorus (46a); *159, 213* M. glaucescens (15); *160*, — M. primuloides (54); *162* M. Torreyi (81); *163* M. bicolor (55); *164* M. latidens (31); *227* M. Douglasii (103); — M. leptanthus (109).

Austin, Mrs. R. M., & Bruce, Mrs. C. C. — M. Lewisii (52).

Babcock, H. H. — M. ringens (1).

Bacon, Mrs. G. D. — M. nasutus (17).

Baer, H. — M. diffusus (61).

Bailey, W. W. — M. alatus (2).

Baker, C. F. *30, 200, 554, 1174, 3448, 4214* M. floribundus (44); *253* M. rubellus (69); *280* M. aurantiacus (112); *312, 392, 759, 1060, 1980, 3017, 3808, 3460, 4142, 4259, 4292* M. guttatus (14), *587* var. puberulus (14a), *1058* var. depauperatus (14b), *588* var. Hallii (14c); *515* M. Douglasii (103); *1010, 1375* M. stamineus (90);

1023 M. montioides (65); *1024* M. nanus (83); *1029* M. Suksdorfii (68); *1248* M. Lewisii (52); *1277* M. primuloides (54), *3830* var. linearifolius (54a); *1336*, *3457*, *4291* M. cardinalis (6); *1510* M. Breweri (67); *1640*, *4152* M. puniceus (113); *2608*, in part, M. nasutus (17), *881* var. micranthus (17b); *2923* M. tricolor (98); *3851* M. Layneae (82); *4410* M. mephiticus (88); *4411* M. coccineus (89); *4544* M. Tilingi (13); *5320* M. longiflorus (108), *4407*, *5354* var. calycinus (108a); *5322* M. brevipes (76).

Baker, C. F., Earle, F. S., & Tracy, S. M. *181*, *451*, *819* M. guttatus (14).

Baker, H. B. *30* M. glabratus var. Fremontii (25a).

Baker, M. S. — M. guttatus (14); — M. Pulsiferae (40); *280* M. floribundus (44); *545* M. moschatus var. longiflorus (46a); — M. Breweri (67); — M. Kelloggii (102); — M. longiflorus (108).

Baker, M. S., & Nutting, F. — M. moschatus var. longiflorus (46a); — M. nanus (84); — M. densus (87); *4056* M. mephiticus (88).

Ballard, C. A. — M. ringens (1).

Bancroft, F. W. — M. guttatus var. arvensis (14e).

Barber, J. H. — M. brevipes (70); — M. Fremontii (77); *298* M. longiflorus (108).

Barber, M. A. *11* M. guttatus var. depauperatus (14b), — var. decorus (14d); — M. moschatus (46), *179* var. sessilifolius (46b); *222* M. Lewisii (52).

Barrett, Mrs. — M. guttatus var. depauperatus (14b); — M. washingtonensis (41); — M. Pulsiferae (40).

Barrus, M. F. *71* M. guttatus (14).

Barrus, M. F., & Reed, *115* hybrid (108b).

Barrus, M. F., & Whetzel, M. *209a* hybrid (108b).

Barss, H. P. — M. ringens (1).

Batchelder, — M. longiflorus (108).

Belding, L. — M. stellatus (111).

Bendire, — M. nanus (83).

Bentley, G. — M. Kelloggii (102); — M. Douglasii (103); M. aurantiacus (112).

Bereman, S. D. *761* M. Tilingi (13).

Berg, N. K. *10* M. moschatus var. sessilifolius (46b).

Bergman, H. F. *2290* M. glabratus var. Fremontii (25a).

Bergman, T. S. — M. alatus (2).

Berlandier, J. L. *781* M. glabratus (25).

Bertero, D. *437*, —, *1148* M. luteus var. variegatus (10b).

Beyrich, H. K. — M. ringens (1).

Bidwell, J. — M. tricolor (98); — M. Douglasii (103).

Bioletti, F. T. — M. nasutus var. insignis (17a); — M. Bioletti (56); — M. pulchellus (100).

Bischoff, F. — M. guttatus (14).

Bixby, S. P. — M. Fremontii (77).

Blaisdell, F. E. — M. aurantiacus (112).

Blanchard, F. — M. ringens (1).

Blankinship, J. W. — M. ringens (1); *389* M. guttatus (14); — M. glabratus var. Fremontii (25a); — M. moschatus (46); *390* M. Lewisii (52).

Blasdale, W. C. — M. dentatus (38); — M. Lewisii (52).

Blumer, J. C. *1399*, *3433* M. guttatus (14); *1551* M. cardinalis (6).

Boettcher, F. L. J. *245* M. ringens (1).

Bolander, H. N. *96* M. cardinalis (6); — M. bicolor (55); 0/4 M. aurantiacus (112); *4521* M. Kelloggii (102); *4690* M. angustatus (98); *4796* M. Douglasii (103); — M. leptanthus (109); *4872* M. primuloides (54); *6016* M. leptaleus (91); *6311* M. Breweri (67); *6314* M. Bolanderi (71); *6316* M. Suksdorfii (68).

Bolander, H. N., & Kellogg, A. — M. Pulsiferae (40).

Bolton, A. L. — M. leptanthus (109).

Boorman, J. L. — M. prostratus (28).

Bowman, A. *2* M. tricolor (98); *21* M. Douglasii (103); *219* M. Bolanderi var. brachydontus (71a).

Brandegee, K. — M. guttatus (14); —

M. nudatus (16); — M. nasutus (17); — M. glabratus var. Fremontii (25a); — M. latidens (31); — M. Grayi (33); — M. floribundus var. geniculatus (44a); — M. moschatus var. sessilifolius (46b); — M. subsecundus var. viscidus (78a); — M. Rattanii (80); — M. Layneae (82); — M. densus (87); — M. mephiticus (88); — M. mohavensis (94); —, *168* M. tricolor (98); — M. modestus (101); — M. Clevelandii (107); — M. longiflorus (108), — var. calycinus (108a), — var. linearis (108e); — M. aurantiacus (112).

Brandegee, T. S. *71* M. guttatus (14); — M. nudatus (16); — M. nasutus (17); — M. glabratus var. Fremontii (25a); *206* M. breviflorus (30); — M. inconspicuus (34); — M. latidens (31); —, *206a*, *815* M. floribundus (44), — var. geniculatus (44a); *226* M. Lewisii (52); — M. bicolor (54); — M. diffusus (61); — M. purpureus var. pauxillus (62a); — M. discolor (64); — M. Fremontii (77); — M. latifolius (95); — M. angustatus (99); — M. Kelloggii (102); — M. Clevelandii (107); — M. stellatus (111); —, *1640* M. puniceus (113); — M. parviflorus (114).

Braunton, E. *472* M. longiflorus var. rutilus (108d); *1146* M. aurantiacus (112).

Brendel, F. — M. glabratus var. Fremontii (25a).

Breninger, E. F. — M. verbenaceus (8).

Brewer, W. H. *586* M. longiflorus (108), *208* var. rutilus (108d); *780* M. subsecundus (78); *953* M. Douglasii (103); *974* M. nasutus var. insignis (17a); *1161* M. latidens (31); *1755* M. primuloides (54); *2144* M. Breweri (67); *2785* M. Whitneyi (93); "*2785* with" M. montioides (65).

Bridges, T. *199* M. Grayi (33); *200* M. Pulsiferae (40); — M. cupreus (11).

Brier, M. — M. leptanthus (109).

Briggs, Mrs. F. E. — M. jungermannioides (45).

Britton, N. L., & Rusby, H. H. *1014* M. glabratus (25).

Broadhead, G. C. — M. guttatus var. depauperatus (14b).

Brown, H. E. *148* M. Douglasii (103); *169*, *842* M. guttatus (14); *183* M. tricolor (98); *198* M. Kelloggii (102); *303* M. Layneae (82); *322* M. Pulsiferae (40); *405*, *669* M. moschatus var. longiflorus (46a); *603* M. primuloides (54); *703*, *834* M. aurantiacus (112); *865* M. cardinalis (6).

Brown, S. *588* M. Lewisii (52); *605* M. Tilingi var. caespitosus (13a); *662* M. moschatus (46).

Brown, V. S., & Wieslander, A. E. — M. moschatus var. longiflorus (46a).

Bruce, Mrs. C. C. *423* M. leptaleus (91); *847* M. densus (87); *859* M. cardinalis (6); *2102* M. Kelloggii (102); *2107* M. tricolor (98).

Bryant, W. — M. latifolius (95).

Buchtien, O. — M. Bridgesii (39).

Buck, — M. luteus var. rivularis (10a).

Buckley, S. B. — M. ringens (1).

Buffum, B. C. *702* M. Lewisii (52); *704* M. guttatus (14).

Burnham, S. H. — M. cardinalis (6); M. guttatus (14), — var. arvensis (14e); — M. arenarius (43); — M. floribundus var. subulatus (44c); — M. Breweri (67); — M. Bolanderi var. brachydontus (71a); — M. subsecundus var. viscidus (78a); — M. aurantiacus (112).

Bush, B. F. *405*, *722*, *921*, *2911*, *5283* M. alatus (2); *1047*, *5320*, *8246* M. ringens (1).

Butler, G. D. *24* M. glabratus var. Fremontii (25a); *1423* M. guttatus (14); *1511*, *1685* M. moschatus var. longiflorus (46a); *1585* M. Layneae (82); *1699* M. primuloides (54), *1770* var. linearifolius (54a); *1733* M. Breweri (67).

Cameron & Lenacker, — M. moschatus var. sessilifolius (46b).

Campbell, M. — M. modestus (101).

Canby, W. W. *35* M. Douglasii (103).

Canby, W. W., & Hammond, H. S. *35* M. Douglasii (103).
Cannon, — M. aurantiacus (112).
Carleton, M. A. — M. alatus (2).
Carlson, J. I. — M. puniceus (113).
Carpenter, A. M. *52* M. Tilingi var. caespitosus (13a); — M. primuloides (54); *53* M. Breweri (67).
Carruth, W. W. — M. aurantiacus (112).
Carter, — M. ringens (1).
Carver, G. W. — M. ringens (1).
Chamberlain, F. M. *44* M. guttatus (14).
Chandler, H. P. *208* M. Layneae (82); *1199* M. dentatus (38); —, *1480* M. Kelloggii (102); *1694* M. guttatus (14).
Chase, A. — M. ringens (1).
Childs, I. J. — M. Johnstonii (75).
Churchill, J. R. — M. guttatus var. depauperatus (14b).
Cipperly, E. M. — M. ringens (1).
Clarke, C. B. *496* M. gracilis (3); *12114* M. nepalensis var. japonica (35a).
Clarke, J. *26*, *290* M. guttatus (14); *162* M. nanus (83); *230* M. moschatus (46); *289* M. floribundus (44).
Clemens, Mrs. J. — M. Lewisii (52).
Clements, F. E. *2786* M. ringens (1); *2969* M. glabratus var. Fremontii (25a).
Clements, F. E., & E. S. *122* M. puniceus (113); *125* M. brevipes (70); *126* M. nasutus (17).
Cleveland, D. — M. cardinalis (6); — M. guttatus (14); — M. brevipes (70); — M. longiflorus (108), — hybrid (108c).
Clute, W. N. *128* M. Eastwoodiae (53).
Coghill, G. E. *129* M. guttatus (14).
Cole, K. E. — M. cardinalis (6).
Comstock, S. — M. guttatus var. puberulus (14a).
Congdon, J. W. — M. cardinalis (6); — M. Grayi (33); *C71* M. Pulsiferae (40); — M. floribundus var. geniculatus (44a), — var. subulatus (44c); — M. moschatus (46); — M. Lewisii (52); — M. Bioletti (56); — M. Palmeri (57); — M. filicaulis (58); M. gracilipes (59); — M. Bolanderi (71), var. brachydontus (71a); — M. subsecundus var. viscidus (78a); — M. Torreyi (81); — M. Layneae (82); — M. coccineus (89); — M. stamineus (90); — M. Congdonii (96); — M. tricolor (98); — M. pulchellus (100); — M. Douglasii (103).
Cook, Prof. — M. brevipes (70).
Cooper, J. G. —, *320* M. puniceus (113); — M. primuloides (54); — M. Bigelovii (74).
Cooper, W. S. *61y* M. nanus (83); *404* M. guttatus (14).
Copeland, E. B. *3017*, *3808* M. guttatus (14); *3177* M. glaucescens (15); *3830* M. primuloides var. linearifolius (54a); *3851* M. Layneae (82).
Cotton, J. S. *394* M. guttatus (14).
Coues, E., & Palmer E. *103* M. guttatus (14); *596* M. verbenaceus (8).
Coulter, T. *636* M. Douglasii (103).
Couthouy, J. P. — M. glabratus (25).
Coville, F. V., & Funston, F. *637*, *1524* M. rubellus (69); *740* M. guttatus (14); *1457* M. nasutus (17); *1474* M. primuloides (54); *1625*, *1798* M. stamineus (90); *1768* M. Suksdorfii (68); *1792* M. densus (87); *1855* M. cardinalis (6).
Cowles, H. C. *362*, *1305* M. guttatus (14); *794* M. Tilingi var. caespitosus (13a); *798* M. Lewisii (52).
Cratty, R. I. — M. ringens (1).
Crawford, D. L. — M. cardinalis (6); M. guttatus (14); — M. floribundus (44); — M. puniceus (113).
Criddle, N. — M. glabratus var. Fremontii (25a).
Culbertson (distributed as Baker, C. F.), *4214* M. floribundus (44); *4259*, *4270*, *4292* M. guttatus (14); *4291* M. cardinalis (6); *4407* M. longiflorus var. calycinus (108a); *4410* M. mephiticus (88); *4411* M. coccineus (89); *4544* M. Tilingi (13).
Curran, M. K. — M. nudatus (16); — M. laciniatus (18); — M. latidens (31); — M. floribundus var. geniculatus (44a); — M. bicolor (55); —

M. androsaceus (60); — M. rubellus (69); — M. Bolanderi (71); — M. Rattani (80); — M. angustatus (99); — M. Kelloggii (102); — M. Douglasii (103); — M. pictus (105).

Curtis, A. H. — M. alatus (2).

Curtis, C. D. *68* M. ringens (1).

Cusick, W. C. *1262, 1951, 2630, 2810, 2997, 3009* M. Cusickii (76); *1627* M. nasutus (17); *1727* M. Lewisii (52); *1891, 2236* M. clivicola (85); *2152, 2655* M. nanus (83); *2206* M. guttatus (14); *2237* M. floribundus (44); *2468, 3115* M. Tilingi (13); *2649* M. primuloides (54); *2773, 3116* M. moschatus (46); — M. Breweri (67).

Dale, H. — M. cardinalis (6); — M. moschatus (46).

Daniels, F. *25* M. guttatus var. Hallii (14c); *247* M. floribundus (44).

Darnell, H. H. *49* M. alatus (2).

Davidson, A. *1108, 2697* M. Bigelovii (74); *1975* M. discolor (64); *3279* M. subsecundus var. constrictus (78b); — M. Parishii (51).

Davidson, C. — M. ringens (1); — M. alsinoides (48).

Davis, H. — M. aurantiacus (112).

Davis, J. —, *129* M. ringens (1); *3342* M: alatus (2).

Davy, J. B. *196* M. aurantiacus (112); *438* M. Douglasii (103); *933* M. latidens (31); — M. Dudleyi (50).

Day, M. A. *9* M. ringens (1).

Dawson, — M. floribundus (44).

Deam, C. C. *58* M. ringens (1); *133, 1577* M. alatus (2).

Dewart, F. W. *7, 26* M. alatus (2).

Dice, L. R. — M. aurantiacus (112).

Dickson, J. H. *6396* M. guttatus var. decorus (14c).

Dix, — M. mephiticus (88).

Douglas, D. — M. cardinalis (6); — M. guttatus (14); — M. floribundus (44); — M. moschatus (46); — M. Lewisii (52); — M. Douglasii (103); — M. longiflorus var. linearis (108e).

Douglas, E. — M. alatus (2).

Dows, B. — M. cardinalis (6).

Dregè, J. — M. gracilis (3).

Drew, E. R. — M. floribundus (44); — M. moschatus var. sessilifolius (46b); — M. Layneae (82).

Drushel, J. A. *888* M. ringens (1); — M. guttatus (14); — M. brevipes (70); — M. longiflorus (108); — M. puniceus (113).

Dudgeon, W., & Kenoyer, L. A. *141* M. gracilis (3).

Dudley, W. R. *430, 3340* M. cardinalis (6); — M. subsecundus (78), *566* var. constrictus (78b); *590* M. mephiticus (88); *605, 1887, 2437, 2942, 3087, 3168* M. primuloides (54), var. linearifolius (54a); — M. longiflorus (108), —, *750* var. calycinus (108a); *687, 921,* — M. moschatus var. longiflorus (46a), — var. sessilifolius (46b); *1369, 3997* M. Bolanderi (71); *1381* M. bicolor (55); *1382* M. acutidens (32); *1430,* —, *1553,* — M. Lewisii (52); *1607* M. Tilingi (13); *1663* M. leptaleus (91); —, *1717* M. leptaleus (91); *1799,* — M. Grayi (33); 2319 M. nasutus (17); *2364,* — M. Breweri (67); *2488, 2498* M. stamineus (90); *3009* M. guttatus (14); — M. dentatus (38); — M. Pulsiferae (40); — M. Dudleyii (50); — M. Palmeri (57); — M. Fremontii (77); — M. Torreyi (81); — M. coccineus (89); — M. modestus (101); — M. Kelloggii (102); — M. leptanthus (109).

Dudley, W. R., & Lamb, F. H. *4359, 4504* M. Bigelovii (74).

Dunn, G. W. — M. brevipes (70).

Dwyer, Bishop — M. gracilis (3).

Earle, F. S. — M. longiflorus (108).

Eastwood, A. *6, 66, 185, 433, 1676, 4455, 4737* M. aurantiacus (112); *19, 461, 543, 4960, 5051, 6388* M. longiflorus (108); *1738a* M. Bigelovii (74); *4613, 6835* M. Kelloggii (102); *6397* M. parviflorus (114); *6502* M. puniceus (113); — M. latidens (31); — M. tricolor (98); — M. modestus (101); — M. leptanthus (109), *4542* M. Rattani (80).

Eby, A. F. — M. ringens (1); — M. alatus (2).

Eby, J. H. — M. ringens (1).

Ecklon, C. F. — M. gracilis (3).

Edwards, Helen, — M. cardinalis (6); — M. nasutus (17); — M. bicolor (55); — M. Torreyi (81); — M. Kelloggii (102); — M. leptanthus (109).

Edwards, H. *505* M. Lewisii (52).

Eisen, G. — M. acutidens (32).

Eisenhower, C. W. — M. ringens (1); — M. alatus (2).

Eliot, H. — M. cardinalis (6); — M. guttatus (14); — M. longiflorus var. calycinus (108a).

Ellis, C. C. *294* M. glabratus var. Fremontii (25a).

Elmer, A. D. E. *164*, *2583*, *3645*, *4857* M. guttatus (14); *642*, *1280* M. Tilingi var. caespitosus (13a); *646*, *2572* M. Lewisii (52); *745* M. moschatus (46), *8074* var. longiflorus (46a), *2589* var. sessilifolius (46b); *752* M. ampliatus (42); *754*, *3354* M. floribundus (44); *774* M. breviflorus (30); *777* M. nasutus (17); *3356* M. Bolanderi (71); *3359*, *4056*, *4941* M. cardinalis (6); *3367* M. leptanthus (109); *3371* M. subsecundus (78); *3821* M. nasutus (17); *3859* M. primuloides (54); *3933* M. brevipes (70); *3959* M. longiflorus (108); *4355*, *4377* M. aurantiacus (112); *4519* M. decurtatus (79); *5049* M. Douglasii (103).

Elmer, O. — M. tricolor (98).

Elrod, M. J. — M. guttatus (14); — M. Lewisii (52).

Emig, W. H. *19*, *69*, *176*, *235* M. alatus (2).

Engelmann, G. — M. ringens (1); — M. Tilingi (13); — M. guttatus (14); — M. floribundus var. membranaceus (44b); — M. moschatus (46); — M. primuloides (54); — M. Layneae (82).

Engelmann, H. — M. glabratus var. Fremontii (25a); — M. guttatus (14).

Epling, C. *5378* M. moschatus (46); *5549*, *5554* M. dentatus (38); *5551* M. guttatus var. depauperatus (14b); *5555* M. Tilingi (13).

Essig, E. O. — M. guttatus (14); — M. Lewisii (52).

Evans, H. M. — M. Lewisii (52); — M. primuloides (54).

Evans, J., & Hammond, H. S. — M. Suksdorfii (68).

Evans, W. H. — M. moschatus var. longiflorus (46a);— M. Cusickii (76); — M. Torreyi (81).

Evermann, B. W. — M. guttatus (14); — M. Lewisii (52).

Faurie, Père, *327* M. sessilifolius (37).

Fendler, A. *558* M. guttatus (14); *559* M. glabratus var. Fremontii (25a).

Fenn, — M. pictus (105).

Fernald, M. L. *364* M. ringens (1).

Ferris, R. S. *699* M. guttatus (14); *758*, *1491*, *1550* M. Douglasii (103); *1204* M. glabratus var. Fremontii (25a); *1458* M. moschatus var. longiflorus (46a); *1459* M. Lewisii (52); *1464* M. stamineus (90); *1490* M. bicolor (55); *1602*, *1626* M. nasutus (17); *1729* M. Fremontii (77).

Ferris, R. S., & Duthie, R. *560* M. Cusickii (76).

Fiebrig, K. *2077* M. glabratus (25).

Fieldstad, F. L. — M. ringens (1).

Fischer, W. *266* M. pilosiusculus (24).

Fitzpatrick, T. J., & Fitzpatrick, M. F. L. — M. ringens (1).

Fletcher, J. — M. Tilingi var. caespitosus (13a).

Flett, J. B. *34*, *161* M. guttatus (14), *9* var. decorus (14d); *130* M. moschatus var. sessilifolius (46b); *168* M. Tilingi var. caespitosus (13a).

Fowler, J. — M. ringens (1).

Freiberg, G. W. — M. guttatus (14); — M. moschatus var. sessilifolius (46b).

Fremont, *201* M. Kelloggii (102); *509* M. aurantiacus (112); *510* M. leptanthus (109); — M. Fremontii (77).

French, C., Jr. — M. gracilis (3); — M. prostratus (28).

Fritchey, J. Q. A. *1* M. Bolanderi var. brachydontus (71a); *3* M. Grayi (33); *6* M. longiflorus (108); *9* M. subse-

cundus var. viscidus (78a); *10* M. modestus (101); *25, 86* M. moschatus var. longiflorus (46a); *39* M. guttatus (14); *69* M. Torreyi (81); — M. alatus (2); — M. brevipes (70); — M. puniceus (113).

Funston, F. *55* M. guttatus (14).

Gammie, G. A. — M. nepalensis var. procerus (35b).

Gardner, N. L. *513, 567* M. guttatus (14); *531* M. cardinalis (6); *536* M. primuloides (54).

Garrett, A. O. *1645* M. Lewisii (52); *1802* M. guttatus (14).

Gates, F. G., & Gates, M. T. *10618* M. glabratus var. Fremontii (25a); *10660* M. ringens (1).

Gay, C. — M. cupreus (11); — M. glabratus var. parviflorus (25b).

Geldern, von C. — M. leptanthus (109).

Getty, F. — M. Douglasii (103).

Geyer, C. A. *119* M. glabratus var. Fremontii (25a).

Ghiesbreght, A. *682* M. glabratus (25).

Gillies, — M. luteus var. alpinus (10e); — M. glabratus var. parviflorus (25b).

Glatfelter, N. M. *328* M. ringens (1).

Goetz, F. *2* M. modestus (101); *4* M. Palmeri (57); *4a* M. Douglasii (103); *5* M. guttatus (14).

Goldman, E. A. *1237* M. Tilingi var. corallinus (13b); *2548* M. spissus (73).

Goodding, L. N. *99* M. rubellus (69); *115, 305, 769, 946, 982, 1650, 1702, 2292, 2299* M. guttatus (14); *130* M, glabratus var. Fremontii (25a); *135. 739* M. verbenaceus (8); *1956* M. Lewisii (52); — M. primuloides (54).

Grant, A. L. *1* M. inconspicuus (34); *2, 3m, 942, 950, 958, 960, 1308* M. bicolor (55); *5, 948, 969, 1004, 1093, 1181, 1309b, 1309c, 1378* M. guttatus (14), *15m, 803, 977, 1231* var. depauperatus (14b); *15* M. Kelloggii (102); *41, 955, 996, 1033, 1178, 1335* M. Breweri (67); *55, 892, 984, 1175, 1468, 1514a* M. moschatus var. longiflorus (46a); *279, 1079, 1309a, 1311* M. leptaleus (91); *291, 1074, 1177, 1341, 1452, 1511, 1512a, 1563* M. primuloides (54); *320, 423, 1513, 1579* M. Tilingi (13), *112, 136, 971, 1081, 1294, 1342, 1411, 1551, 1614a* var. corallinus (13b); *357* M. stamineus (90); *647* M. tricolor (98); *766, 954, 957, 976, 1232* M. pulchellus (100); *781* M. subsecundus var. viscidus (78a); *807, 967, 995* M. Bioletti (56); *809* M. Bolanderi (71), *1005, 1065, 1264* var. brachydontus (71a); *823, 1344, 1469* M. floribundus (44), *44, 805, 970* var. subulatus (44c); *850, 963, 969, —, 1300* M. Torreyi (81); *949, 1006, 1133, 1266* M. nasutus (17); *951, 983, 997, 1002, 1622* M. laciniatus (18); *956, 1270, 1298a* M. mephiticus (88); *968, 1041, 1200, 1296, 1310, 1356, 1458, 1494* M. Layneae (42); *1032, 1119, 1309, 1336, 1344a, 1412* M. arenarius (43); *1080, 1024, 1421a, 1480* M. discolor (64); *1116, 1567* M. Lewisii (52); *1207* M. Douglasii (103); *1208* M. modestus (101); *1397, 1700, 1701* M. cardinalis (6); *1481* M. leptaleus (91); *1618* M. longiflorus, hybrid (108b), *1619* hybrid (108c), *1650* var. rutilus (108d); *1662a* M. leptaleus (91); *1696* M. parviflorus (114).

Grant, G. B. *285, 3753* M. puniceus (113); *286*, — M. longiflorus (108); *790, 4452, 4488, 6658* M. floribundus (44), *790a* var. membranaceus (44b); *1409, 6923* M. primuloides (54); *2345* M. Grayi (33); *2423, 6636*, M. brevipes (70); *4245* M. moschatus (46), *1930, 4242* var. longiflorus (46a); *4454* M. cardinalis (6); *6203* M. Fremontii (77); *6352* M. Tilingi var. corallinus (13b); *6688* M. Bigelovii (74); *6946* M. Breweri (67).

Grant, G. B., & Wheeler, W. *6135* M. guttatus (14); *6143* M. cardinalis (6).

Grant, J. M. — M. dentatus (38); — M. moschatus (46).

Gray, Asa, — M. glaucescens (15); — M. moschatus var. sessilifolius (46b); — M. bicolor (55); — M. Torreyi (81); — M. mephiticus (88); — M.

leptaleus (91); — M. tricolor (98); — M. longiflorus (108).
Greene, E. L. *10* M. tricolor (98); *224* M. floribundus (44); *734* M. alsinoides (48); *989*, — M. primuloides (54); — M. Tilingi (13), — var. caespitosus (13a), — var. corallinus (13b); — M. guttatus (14); — M. glaucescens (15); — M. nasutus (17); — M. moschatus var. longiflorus (46a); — M. Lewisii (52); — M. Breweri (67); — M. tricolor (98); — M. longiflorus (108); — M. stellatus (111); — M. aurantiacus (112); — M. parviflorus (114).
Greenman, J. M. *1528*, *2112* M. ringens (1).
Gregg, J. — M. glabratus (25), *195*, *331*, *716*, var. Fremontii (25a).
Gregory, Mrs. — M. purpureus (62).
Griffiths, D. *4182* M. guttatus (14); *4183* M. rubellus (69); *4815* M. verbenaceus (8); — M. glabratus var. Fremontii (25a).
Grinnell, J. *7* M. parviflorus (114); *8* M. cardinalis (6).
Grinnell, F., Jr. — M. cardinalis (6); — M. floribundus (44); — M. moschatus var. longiflorus (46a); — M. brevipes (70); — M. longiflorus (108).
Gross, C. A. *23* M. cardinalis (6); *79* M. aurantiacus (112); *106* M. angustatus (99).
Hall, E. *374* M. guttatus var. decorus (14d); *376* M. moschatus var. sessilifolius (46b).
Hall, E., & Harbour, J. P. *398* M. guttatus var. Hallii (14c); *399* M. glabratus var. Fremontii (25a).
Hall, H. M. *709*, *2403*, *7508* M. Tilingi var. corallinus (13b); *1292*, *1523*, *8555* M. moschatus var. longiflorus (46a); *1312*, *2349* M. primuloides (54); *1449* M. Palmeri (57); *1458* M. rubellus (69); *1543*, *2049*, *7791* M. Fremontii (77); *1959* M. diffusus (61); *2058* M. brevipes (70); *2202* M. floribundus (44); *2346*, *8704* M. Breweri (67); *2382* M. cardinalis (6); *3160*, *7739* M. longiflorus (108); *2928* hybrid (108b); *6011* M. Bigelovii (74); *7571* M. Parishii (51); *8897* M. pulchellus (100); *9055* M. mephiticus (88); *9056* M. Layneae (82); *9298* M. Torreyi (81); *9907* M. latidens (31).
Hall, H. M., & Babcock, E. B. *3532*, *3533* M. primuloides (54); *4154* M. Breweri (67); *5033* M. subsecundus var. viscidus (78a); *5405* M. mephiticus (88).
Hall, H. M., & Babcock, H. B. *5050* M. discolor (64); *5107*, *5113*, *5113b*, *5113c*, *5155* M. deflexus (66); *5218* M. stamineus (90); *5622* M. mephiticus (88).
Hall, H. M., & Chandler, H. P. *4* M. subsecundus var. viscidus (78a); *5* M floribundus var. geniculatus (44a); *21*. M. acutidens (32); *63* M. bicolor (55); *64*, *4782* M. Torreyi (81); *123* M. laciniatus (18); *169* M. primuloides (54); *208* M. Layneae (82); *212* M. moschatus var. longiflorus (46a); *321* M. Breweri (67); *339*, *5155b*, *5155c* M. discolor (64); *352* M. Lewisii (52); *377* M. Whitneyi (93); *429* M. leptaleus (91); *511* M. longiflorus var. calycinus (108a); *692* M. Tilingi var. corallinus (13b); *6790* M. Bigelovii (74); *6817* M. mohavensis (94).
Hall, H. M., & Hall, G. C. *8346* M. mephiticus (88).
Hammond, E. W. *310* M. cardinalis (6); *311* M. guttatus (14); *312* M. moschatus (46); — M. Douglasii (103).
Hannibal, E. — M. tricolor (98); — M. aurantiacus (112).
Hansen, G. *108* M. Douglasii (103); *109*, *1291* M. Kelloggii (102); *134* M. cardinalis (6); *135*, *473*, *1049*, *1288* M. nasutus (17); *441* M. Breweri (67); *462*, *471* M. Lewisii (52); *462* M. primuloides (54); *463* M. mephiticus (88); *466*, *1121*, *1122*, *1729* M. bicolor (55); *1050*, *1801*, *2053* M. guttatus (14), *1048*, *1287* var. arvensis (14e); *1051*, *1052* M. aurantiacus (112); *1124*, *1125* M. Torreyi (81); *1126*, *1290* M. inconspicuus (34);

1289 M. Tilingi (13); *1683* M. angustatus (99); *1809* M. Bolanderi (71); *1908* M. moschatus (46), *465*, *1951* var. longiflorus (46a).
Hanson, H. C. *590* M. glabratus var. Fremontii (25a).
Hardy, M. M. — M. leptanthus (109).
Harper, R. *342* M. ringens var. minthodes (1a).
Harris, J. A. *C16295*, *C16440* M. cardinalis (6); *C16309* M. guttatus (14).
Hartman, C. V. — *288* M. dentilobus (21).
Hartweg, T. *1892* M. bicolor (55); — M. moschatus var. sessilifolius (46b); — M. tricolor (98).
Harvey, W. H. — M. repens (26).
Harwood, R. D. *4347* M. moschatus var. sessilifolius (46b); *4349* M. purpureus (62).
Harz, E. — M. guttatus (14).
Hasse, H. E. — M. alatus (2); — M. cardinalis (6); — M. nasutus (17);— M. floribundus (44); — M. moschatus var. longiflorus (46a), — var. sessilifolius (46b); — M. brevipes (70); — M. longiflorus (108).
Hasse, H. E., & Davidson, A. — M. floribundus var. geniculatus (44a).
Hastings, G. T. *423*, *523* M. luteus var. rivularis (10d).
Hawver, E. P. — M. aurantiacus (112).
Hayden, F. V. — M. guttatus (14); — M. glabratus var. Fremontii (25a); — M. nanus (83).
Heacock, E. R. *407* M. Tilingi var. caespitosus (13a).
Heerman, A. L. — M. Kelloggii (102).
Heller, A. A. *5923*, *13060* M. moschatus (46), *6947*, *6973*, *7960*, *11511*, *11714*, *12064*, *12165*, *12797*, *12875* var. longiflorus (46a), *12828* var. sessilifolius (46b); *5924*, *6829*, *7163*, *7433*, *7838*, *8027*, *8343*, *8376*, *8517*, *10420*, *10755*, *11200*, *11492*, *11868*, *12771*, *12813*, *13147*, *13191*, *13271*, *13284*, *13417* M. guttatus (14), *8323*, *13061* var. depauperatus (14b), *10569* var. Hallii (14e), *5687*, *7393*, *12299* var. arvensis (14e); *5927*, *6893*, *11495* M. Breweri (67); *6210*, *8212*, *10889* M. rubellus (69); *6580*, *7449*, *12305* M. aurantiacus (112); *6870*, *10799*, —, *11414*, *12271* M. Torreyi (81); *6972*, *9786*, *11497*, *13309* M. primuloides (54); *7067* M. leptaleus (91); *7137*, *9969*, *12918*, *13318* M. Tilingi (13), *7004*, *10922*, *12539* var. corallinus (13b); *7173* M. densus (87); *7141*, *9564*, *10203*, *12155*, *12620* M. Lewisii (52); *7272* M. Douglasii (103); *7508*, *7858*, *8158*, *8591*, *10192*, *11339* M. nasutus (17), *12344* var. insignis (17a), *7410*, *8936*, *13256* var. micranthus (17b); *7771* M. longiflorus var. calycinus (108a); *7961*, *11805*, *13261*, *13391* M. Pulsiferae (40); *7963*, *8194*, *11919* M. Layneae (82); *8142* M. floribundus var. membranaceus (44b); *8279*, *10890* M. Bigelovii (74), *8194* var. cuspidatus (74a); *9733* M. Suksdorfii (68); *10343* M. angustifolius (86); *10407* M. leptanthus (109); *11314* M. tricolor (98); *11338*, *11905* M. bicolor (55); *11340*, *11340a*, *13191* M. glaucescens (15); *11343* M. latidens (31); *11374* M. Kelloggii (103); *11806* M. angustatus (99); *11927*, *11992* M. Bolanderi var. brachydontus (71a); — M. Fremontii (77); *13142* M. nudatus (16.)
Heller, A. A., & E. G. *3143* M. nasutus (17); *3315* M. moschatus (46), *3961* var. sessilifolius (46b); *3320* M. breviflorus (30); *3324* M. nanus (83); *3330* M. ampliatus (42); *3926* M. dentatus (38); *3986*, —, *4006*, M. guttatus (14), *4006*, in part, var. decorus (14d).
Heller, A. A., & Brown, H. E. *5146*, *5282*, *5464* M. Kelloggii (102); *5258*, *5388* M. aurantiacus (112); *5306*, *5503* M. nasutus (17), *5349* var. insignis (17a); *5417*, *5554* M. tricolor (98); *5461* M. glaucescens (15); *5493* M. guttatus (14); *5331* var. arvensis (14e); *5545* M. bicolor (55).
Heller, A. A., & Halbach, E. G. *633* M. alatus (2).
Heller, A. A., & Kennedy, P. B. *8672*

M. densus (87); *8688* M. Suksdorfii (68); *8753* M. Breweri (67); *8783* M. primuloides (54); *8794* M. guttatus (14); *8819* M. Torreyi (81).

Henderson, L. F. *753* M. Douglasii (103); *754* M. Lewisii (52); *755* M. primuloides (54); *2264, 4610* M. breviflorus (30); *2675, 2675a, 2676* M. ampliatus (42); — M. guttatus var. decorus (14d); — M. floribundus (44); — M. moschatus (46); — M. alsinoides (48).

Henry, A. *5897, 7445, 10450* M. nepalensis (35).

Henry, J. K. *9054* M. moschatus var. longiflorus (46a); — M. nasutus (17); — M. alsinoides (48).

Henshaw, H. W. *100* M. diffusus (61); — M. brevipes (70); — M. Fremontii (77).

Herbrand, M. — M. leptanthus (109).

Herrick, C. L. *33* M. glabratus var. Fremontii (25a).

Hiatt, O. — M. longiflorus (108).

Hieronymus, G., & Lorentz, P. G. *719* M. glabratus (25).

Hitchcock, A. E. *1256* M. rubellus (69).

Hitchcock, A. S. — M. ringens (1); — M. alatus (2); — M. glabratus var. Fremontii (25a).

Hitchcock, M. *24* M. cardinalis (6).

Hochstetter, *1629* M. gracilis (3).

Holzinger, J. M. — M. dentilobus (21).

Hooker, J. D. — M. repens (26); — M. nepalensis var. japonica (35a), var. procerus (35b).

Hopping, R. *111* M. Palmeri (57).

House, H. D. *4978* M. guttatus (14).

Howard, Mrs. C. W. *22* M. gracilis (3).

Howell, J. — M. stamineus (90).

Howell, T. *236* M. Pulsiferae (40); *382* M. cardinalis (6); *454*, — M. alsinoides (48); *517* M. floribundus (44); *519* M. washingtonensis (41); *1242, 1246, 1466* M. Douglasii (103); — *1243* M. primuloides (54); *1244* M. guttatus (14); *1454* M. aurantiacus (112); — M. dentatus (38); — M. Lewisii (52); — M. Cusickii (76); — M. nanus (85); — M. stamineus (90).

Hull, W. R. — M. guttatus (14).

Hutchings, J. M. — M. mephiticus (88).

Illin, N. *165* M. glabratus (25).

Ingalls, M. P. — M. aurantiacus (112).

Jackson, H. S., & Hammond, E. W. — M. nanus (83).

Jackson, H. S., & Standley, P. — M. Lewisii (52).

James, J. F. — M. alatus (2).

James, — M. glabratus var. Fremontii (25a).

Jenkins, & Street, L. *1938* M. brevipes (70); — M. nasutus (17); — M. floribundus (44).

Jepson, W. L. *2m, 4m, 14m, 15m, 21m, 687, 1198a, 1812, 2503, 4043, 4142, 4812, 5569, 6326, 7853, 7955, 8397, 8833, 8994,* M. guttatus (14), *12m, 3482, 4909, 6429* var. depauperatus (14b), *1m, 10m, 11m, 4628, 6238, 6238a, 8370, 9171, 9285* var. arvensis (14e); *3m, 6m, 7m, 19m, 66m, 4274a, 9168, 9169, 9172, 9173* M. nasutus (17), *8m* var. insignis (17a); *26m* M. cardinalis (6); *31m, 32m, 33m* M. latidens (31); *34m, 35m, 36m, 71m, 3037a, 3142, 4327, 6169, 6361, 6888, 9000* M. Layneae (82); *28m, 63m, 68m, 6388, 6398* M. Kelloggii (102); *37m* M. nanus (83); *38m, 3143, 3442, 4627, 6401* M. floribundus var. subulatus (44c); *52m, 53m, 3341, 7266* M. primuloides (54); *54m, 67m, 740, 775, 2108, 4273, 5072* M. Breweri (67); *55m, 57m, 58m* M. Pulsiferae (40); *61m, 6335* M. Douglasii (103); *62m, 8252* M. tricolor (98); *69m, 4070, 4635, 8396* M. Torreyi (81); *72m* M. Bioletti (56); *591, 4321* M. Grayi (33); *593, 4862, 6741, 8492* M. longiflorus, hybrid (108c), *8504* var. linearis (108e); *658, 4274* M. laciniatus (18); *699, 3214a, 4674* M. mephiticus (88); *904, 1020, 3355, 8091* M. Tilingi (13), *868* var. caespitosus (13a), *771, 3406, 4086, 4334, 4574 4641, 4692, 4887a, 5076, 6479* var. corallinus (13e); *717, 4310, 6489b* M. discolor (64); *946, 4957, 5057, 7304* M. stamineus (90); *979, 2846, 4688* M. coccineus (89); *1211, 1518 5552, 6106, 9133* M.

brevipes (70); *1402* M. Parishii (51); *1524* M. diffusus (61); *1573, 2680, 5581, 8681* (77); *1604a* M. puniceus (113); *1651* M. subsecundus (78), *65m, 566, 793, 1797, 2750, 4869, 7181* var. *viscidus* (78a); *1656, 2247, 6352* M. Bolanderi (71), *22m, 2751, 4314, 9054* var. brachydontus (71a); *1691, 4150* M. leptanthus (109); *1846*, — M. angustatus (99); *2797* M. acutidens (32); *3367, 4480, 8111, 8165* M. Lewisii (52); *4112* M. Jepsonii (92); *4272, 7855* M. moschatus (46), *42m, 44m, 45m, 46m, 51m, 680a, 2300, 3161a, 4429, 4640, 4883, 4980, 8342, 9803* var. longiflorus (46a), *43m, 47m, 48m, 49m, 50m* var. sessilifolius (46b); *4968, 5058, 5068* M. deflexus (66); *5070, 7262* M. Suksdorfii (68); *5823* M. mohavensis (31); *5862, 5911, 6956, 8580, 8797, 8945* M. Bigelovii (74), *6888* var. cuspidatus (74a); *6341, 6371* M. inconspicuus (34); *7305* M. densus (87).

Jepson, W. L., & Hall, H. M. *1293* M. Fremontii (77); *1959* M. diffusus (61).

Johnson, R. — M. tricolor (98).

Johnston, E. L. *120* M. glabratus var. Fremontii (25a); *351* M. floribundus var. membranaceus (44b).

Johnston, I. M. *1203*, — M. brevipes (70); *1204* M. guttatus (14); *1486, 1562* M. Johnstonii (75); *1524* M. cardinalis (6); —, *1607* M. longiflorus (108), *2286, 2288, 2295* hybrid (108b), *2280 2281, 2283, 2284, 2289, 2292, 2293, 2297* hybrid (108c), *2282, 2285, 2290, 2291, 2294, 2296* var. linearis (108e); *2307* M. nasutus (17); *2312* M. Fremontii (77); *2900* M. Breweri (67); *4113* M. dentilobus (21); *5590* M. Bigelovii (74); — M. floribundus, (44); — M. primuloides (54); *2284, 2298* M. puniceus (113).

Jones, M. E. *212* M. glabratus var. Fremontii (25a); *1655* M. Parryi (72); *2396* M. leptaleus (91); *2459* M. Jepsonii (92); *3188*, — M. Fremontii (77); *3288* M. leptanthus (109); *3439* M. puniceus (113); —, *3860* M. Bigelovii (74), *5054* var. cuspidatus (74a); *5272* M. guttatus (14); *5349* M. Eastwoodiae (53); *6486* M. Lewisii (52); — M. Tilingi (13); — M. moschatus var. longiflorus (46a); — M. primuloides (54); — M. Suksdorfii (68); — M. Torreyi (81).

Jorgensen, P. *980* M. glabratus (25); *1268* M. luteus var. alpinus (10e).

Kellerman, W. A. — M. glabratus var. Fremontii (25a).

Kelley, H. — M. Palmeri (57).

Kellogg, A., & Branner, J. M. — M. moschatus var. longiflorus (46a).

Kellogg, A., & Harford, W. G. W. *683* M. alsinoides (48).

Kellogg, J. H. *133* M. alatus (2).

Kennedy, P. B. *190, 269* M. Lewisii (52); *577* M. guttatus (14), *4356* var. Hallii (14c); *598* M. nanus (83); *1487* M. Bigelovii var. cuspidatus (74a); *1886* M. Tilingi var. corallinus (13b); *4091, 4401* M. densus (87).

Kennedy, P. B., & Doten, S. B. *106* M. nasutus (17); *118* M. guttatus var. depauperatus (14b); *121* M. Breweri (67).

King, M. A. — M. cardinalis (6); — M. brevipes (70).

Kirk, T. *124*, — M. repens (26).

Kirkwood, J. E. *28, 29* M. Lewisii (52); *51* M. Tilingi (13).

Kitts, C. W. — M. leptanthus (109).

Kofoid, C. A. — M. glabratus var. Fremontii (25a).

Komarov, V. — M. nepalensis (35).

Kuntze, O. — M. gracilis (3); — M. luteus var. rivularis (10a).

Lake, & Hull, W. R. — M. guttatus (14); — M. Lewisii (52).

Lamb, F. H. *1065* M. guttatus (14).

Langille, H. D. — M. Lewisii (52).

Lathrop, L. — M. Lewisii (52); — M. tricolor (98); — M. Douglasii (103).

Laybourn, W. A. *16* M. glabratus var. Fremontii (25a).

Leiberg, J. B. *348, 2018, 2076* M. Suksdorfii (68); *383, 1168* M. moschatus (46); *491, 1167* M. Pulsiferae (40); *1071, 1519* M. guttatus (14);

1365 M. Breweri (67); *1394, 1446* M. Tilingi (13); *1424* M. Lewisii (52); *5171* M. Leibergii (47).

Lemmon, J. G. *72* M. moschatus var. longiflorus (46a); *1129½* M. bicolor (55); *3270* M. Suksdorfii (68); — M. cardinalis (6); — M. floribundus (44); — M. Lewisii (52); — M. Bolanderi var. brachydontus (71a); — M. Fremontii (77); — M. mohavensis (94); — M. Jepsonii (92).

Letterman, G. W. *80* M. Lewisii (52); *116*, — M. nanus (83); — M. moschatus (46); — M. guttatus (14).

Lister, — M. nepalensis var. japonica (35a).

Lindheimer, F. *717* M. glabratus (25).

Lloyd, C. E. *438* M. glabratus (25); *440* M. dentatus (21).

Lloyd, F. E. — M. dentatus (38).

Lucy, T. F. *154* M. ringens (1).

Lunnell, J. — M. guttatus var. decorus (14d); — M. moschatus (46); — M. alsinoides (48).

Lyall, T. — M. madagascariensis (4); — M. alsinoides var. minimus (48a).

Lyon, M. W., Jr. *58* M. moschatus (46); *59* M. guttatus var. decorus (14d).

Macbride, J. F. *59, 402* M. nanus (83); *170* M. nasutus (17); *261, 421, 569* M. moschatus (46); *403, 808, 2541* M. guttatus (14), *143* var. depauperatus (14b); *404* M. Breweri (67); *414, 571* M. Lewisii (52); *665* M. primuloides (54); *775* M. Suksdorfii (68); *900* M. breviflorus (30).

Macbride, J. F., & Payson, E. B. *750* M. cardinalis (6); *759* M. brevipes (70); *765* M. floribundus (44); *2930, 3049* M. nanus (83); *3093* M. breviflorus (30); *3419, 3752* M. Tilingi var. caespitosus (13a); *3627* M. primuloides (54); *3703* M. Breweri (67); *3731* M. Lewisii (52).

McCalla, W. C. *457* M. ringens (1).

McCallum, Mrs. A. — M. aurantiacus (112).

McClatchie, A. J. *96* M. diffusus (61).

McCormick, P. — M. cardinalis (6).

MacDaniels, L. H. *137* M. ringens (1).

McDonald, F. E. — M. ringens (1).

MacDougal, D. T. *15* M. rubellus (69); *244* M. guttatus (14); — M. verbenaceus (8); — M. leptanthus (109).

McGregor, E. A. *32* M. floribundus (44); *40* M. Lewisii (52); *66* M. aurantiacus (112); *105* M. brevipes (70); 191 M. leptaleus (91); *223* M. alatus (2); *337* M. Bigelovii (74); *954* M. Fremontii (77).

MacKay, E. *11, 17* M. guttatus (14).

MacKenzie, K. K. *289, 292, 295* M. alatus (2); *352* M. guttatus (14); *2837* M. ringens (1).

McMurphy, J. *25, 294* M. aurantiacus (112); *295* M. cardinalis (6); *297* M. moschatus var. sessilifolius (46b); — M. Layneae (82).

Macoun, J. M. *702, 54480, 87665* M. guttatus (14); *703, 54483 87669* M. alsinoides (48); *54485, 76792* M. Lewisii (52); *67855* M. Breweri (67); — M. Tilingi (13), *76795, 76796* var. caespitosus (13a); *76789* M. moschatus (46), —, *54474*, var. longiflorus (46a), *87657* var. sessilifolius (46b); *80935* M. ringens (1); *87662* M. nasutus (17); — M. floribundus (44).

Maiden, J. H. — M. prostratus (28).

Mains, G. B. *D-70* M. Lewisii (52).

Marsh, C. D. *14165* M. Lewisii (52).

Matsumura, J. — M. nepalensis (35).

Mathews, W. C. *30* M. aurantiacus (112); *135* M. moschatus var. sessilifolius (46b); *177* M. cardinalis (6).

Mearns. E. A. *3507* M. brevipes (70); *3659* M. longiflorus var. linearis (108e); *3948, 4030* M. cardinalis (6).

Meehan, T. — M. guttatus (14); — M. laciniatus (18); — M. Lewisii (52); — M. bicolor (55); — M. subsecundus (78).

Mell, C. D. — M. ringens (1).

Mell, C. D., & Knopf, — M. glabratus var. Fremontii (25a); — M. floribundus var. geniculatus (44a).

Merrill, E. D., & Wilcox, E. N. *819* M. guttatus (14); *827* M. floribundus var. membranaceus (44b); *971, 1072* M. Lewisii (52).

Mertens, Dr. — M. glabratus var. parviflorus (25b).

Metcalfe, O. B. *28, 208* M. glabratus var. Fremontii (25a); *28*, in part, *1537* M. guttatus (14); *1536* M. rubellus (69).

Michener, & Bioletti, F. — M. cardinalis (6); — M. nasutus (17), — var. insignis (17a); — M. moschatus var. longiflorus (46a).

Miles, L. O. *206* M. Lewisii (52).

Miller, Mrs. C. E. — M. longiflorus (108); — M. parviflorus (114).

Miller, Mrs. C. E., & Grant, Mrs. A. L. *1703, 1704* M. parviflorus (114).

Mizo-hoduki, — M. nepalensis var. japonica (35a).

Moffatt, W. S. *1652* M. ringens (1).

Monks, S. P. *6* M. cardinalis (6).

Moore, Mrs. S. H. — M. guttatus (14).

Morong, T. *66* M. ringens (1); *1213* M. glabratus var. parviflorus (25b).

Moseley, E. L. — M. ringens (1); — M. alatus (2).

Moxley, G. *582* M. subsecundus var. constrictus (78b).

Mueller, F. von — M. gracilis (3); — M. repens (26); — M. prostratus (28); — M. pusillus (29).

Muenscher, W. L. C. *375, 5070* M. guttatus (14); *964* M. moschatus (46); *965* M. Lewisii (52).

Mulford, I. *353*, — M. guttatus (14); *1152* M. glabratus var. Fremontii (25a); — M. moschatus (46); — M. Lewisii (52); — M. nanus (83); — M. tricolor (98).

Munson & Hopkins, — M. cardinalis (6).

Munz, P. A. *137* M. glabratus var. Fremontii (25a); *328* M. ringens (1); *1145, 1219, 2266, 3100, 3159* M. guttatus (14); *1207* M. cardinalis (6); *2033* M. longiflorus (108), *3362* var. rutilus (108d); *2145* M. puniceus (113); *2780* M. nasutus (17); *3028* M. Tilingi (13); *3613* M. Bigelovii (74); *4615* M. moschatus var. sessilifolius (46b); *5135* M. diffusus (61); *5651* M. purpureus (62); *5657, 5995* M. Suksdorfii (68); *5911* M. rubellus (69); *6707* M. puniceus (113); *7005* M. Fremontii (77); *7027* M. primuloides (54); *7062* M. Clevelandii (107).

Munz, P. A., & Harwood, R. D. *4010* M. longiflorus (108), *3356, 3339* hybrid (108c); *3758, 3853, 3854* M. puniceus (113); *4006* M. brevipes (70).

Munz, P. A., & Johnston, I. M. *2850* M. Breweri (67); *2856* M. Palmeri (55); *2858* M. moschatus var. longiflorus (46a); *5202, 5215* M. Parishii (51); *5217* M. rubellus (69); *5378* M. latidens (31); *5467* M. diffusus (61).

Munz, P. A., Johnston, I. M., & Harwood, R. D. *4031*, in part, *4514* M. guttatus (14); *4031*, in part, M. nasutus (17).

Munz, P. A., Street, L., & Williams, R. G. *2447* M. longiflorus, hybrid (108b).

Munz, P. A., Williams, R. G., & Corwin, G. *2915* M. Lewisii (52).

Najarre, P. — M. glabratus var. parviflorus (25b).

Nelson, A. *543, 8344, 9545* M. glabratus var. Fremontii (25a); *688*, in part, *1670, 2372, 3573, 9394* M. guttatus (14); *688*, in part, M. Tilingi var. corallinus (13b); *1287* M. Suksdorfii (68); *1672, 3531, 6276, 8523* M. Lewisii (52); *7440, 9076* M. floribundus (44), *1515, 1683, 7729, 8828, 8951* var. membranaceus (44b).

Nelson, A., & Macbride, J. F. *1032* M. Cusickii (76); *1227* M. nanus (83); *1278, 1344, 1842* M. guttatus (14), *1908* var. Hallii (14c); *1959* M. nasutus var. micranthus (17b); *2235* M. floribundus var. geniculatus (44a).

Nelson, A., & Nelson, E. *5494, 6256* M. nanus (83); *5748, 5841* M. guttatus (14), *6285* var. depauperatus (14a); *6371* M. Breweri (67).

Nelson, E. W. *797* M. nanus (83); *4775* M. Nelsonii (9); *6027* M. guttatus (14).

Nelson, J. C. *120* M. dentatus (38); *202* M. moschatus var. sessilifolius (46b); *1136* M. alsinoides (48).

Nevin, J. C. — M. Parishii (51).

Newberry, J. S. — M. Torreyi (81).

Newell, G. — M. longiflorus (108).

Newlon, L. M. *1m* M. mephiticus (88).

Nichols, V. *831, 1006, 1008* M. aurantiacus (112); *901, 905, 907, 908, 1013, 1014, 1016, 1017* M. longiflorus (108).

Nordyke, A. — M. guttatus (14).

Norton, J. B. *379* M. glabratus var. Fremontii (25a).

Nuttall, T. — M. dentatus (38); — M. alsinoides (48).

Officer, E. — M. prostratus (28).

Oleson, O. M. *14* M. nanus (83); *15, 22* M. guttatus var. depauperatus (14b).

Orcutt, C. R. *131, 1295* M. puniceus (113); *133* M. brevipes (70); *134,* — M. guttatus (14); *432* M. moschatus var. longiflorus (46a); *591,* — M. floribundus (44); *845* M. diffusus (61); *1094* M. Fremontii (77); *1179,* — M. latidens (31); *1198* M. exiguus (63); *1304* M. nasutus (17); — M. cardinalis (6); — M. Parishii (51); — M. Bigelovii (74); — M. longiflorus (108); — M. aridus (110).

Orcutt, H. C. *132* M. cardinalis (6).

Osterhout, G. *2716, 5253* M. glabratus var. Fremontii (25a); *3261* M. Suksdorfii (68); *3508* M. rubellus (69).

Ottley, A. M. *621* M. brevipes (70); *681, 900, 1116, 1271, 1525* M. guttatus (14); *786* M. leptaleus (91); *815, 1448* M. primuloides (54); *930* M. stamineus (90); *1180, 1242, 1315* M. nasutus (17); *1356* M. acutidens (32); *1405* M. subsecundus var. viscidus (78a); *1431* M. bicolor (55); *1437* M. angustatus (99); *1455* M. discolor (64); *1486* M. moschatus var. longiflorus (46a), *1516* var. sessilifolius (46b); *1487* M. mephiticus (88).

Overacker, — M. ringens (1).

Overholts, L. O. *10161* M. Tilingi var. corallinus (13b); — M. alatus (2).

Painter, J. H. *760, 816* M. alatus (2).

Palmer, Edw. *16, 17, 145, 289* M. guttatus (14); *55, 87* M. pallens (20); *58, 839* M. latifolius (95); *62, 323* M. floribundus (44); *104, 124, 164, 179* M. glabratus (25), *162, 235, 366* var. Fremontii (25a); *161* M. primuloides (54); *176* M. deflexus (66); *233* M. nasutus (17); *278* M. brevipes (70); *283* M. puniceus (113); *321½* M. Palmeri (57); *322* M. subsecundus (78); *328, 441* M. verbenaceus (8); *383* M. Parryi (72); *632* M. rubellus (69); *728* M. stellatus (111); *2603* M. Layneae (82).

Palmer, Ernest J. *420, 951, 1075, 1550, 4044, 4663, 6488, 8942, 10648, 16582, 16685* M. alatus (2); *1481* M. ringens (1); *11793* M. glabratus (25), *18035* var. Fremontii (25a).

Palmer, E. L. *1084, 1089* M. ringens (1).

Pammel, L. H. *143* M. guttatus (14); — M. ringens (1).

Pammel, L. H., & Blackwood, R. E. *3706* M. guttatus (14); *3784* M. moschatus; *3813* M. Lewisii (52).

Parish, S. B. *117, 4755, 5620, 11226, 11958* M. brevipes (70); *119, 4189, 10544, 11980* M. cardinalis (6); *465, 3016, 4791, 4904, 5094, 5619, 11225, 11912,* — M. Fremontii (77); *631, 5800,* — M. Palmeri (57); *1217, 1982, 10119,* — M. Bigelovii (74); *9242, 10039,* — var. cuspidatus (74a); *1378* M. rubellus (69); *1460, 1495, 10537* M. Parishii (51); *1463, 10952* M. moschatus var. longiflorus (46a), *10951* var. sessilifolius (46b); *1719, 2962* M. Breweri (67); *1851,* — M. Suksdorfii (68); *1852* M. exiguus (63); *1862, 4903* M. purpureus (62); *3076, 3077* M. primuloides (54); *4468, 4792, 11346, 11987, 19264* M. longiflorus (108), *19226* var. rutilus (108d); *5063* M. Tilingi (13), *3606* var. corallinus (13b); *5764, 11170,* — M. nasutus (17); *9242, 10039,* — M. Layneae (82); *9243* M. mohavensis (94); *10606, 11172, 11961* M. floribundus (44), *5405* var. membranaceus (44b); *11191, 11311, 11567* M. guttatus (14); *11502* M. aurantiacus (112).

Parry, C. C. *147* M. Parryi (72); *235* M. guttatus (14); *353* M. cardinalis (6); — M. glaucescens (15); — M. bicolor (55); — M. Suksdorfii (68); — M. decurtatus (79); — M. Rattani (80);

— M. Layneae (82); — M. Douglasii (103); — M. puniceus (113).

Parry, C. C., & Lemmon, J. G. *308* M. Palmeri (55); *309* M. Fremontii (77); *310* M. brevipes (70); *311* M. longiflorus (108); *312* M. Breweri (67).

Patterson, H. N. *251* M. floribundus var. membranaceus (44b); *294* M. guttatus var. Hallii (14c).

Patterson, H. N., & Wiltz. — M. floribundus (44); — M. aurantiacus (112).

Patzky. — M. verbenaceus (8).

Paulson, M. — M. aurantiacus (112).

Payson, E. B. *16*, *110* M. guttatus (14); *331* M. rubellus (69).

Payson, E. B., & Payson, L. B. *1754* M. nasutus (17); *1755*, *2226* M. floribundus (44); *1791*, *2018* M. guttatus (14).

Peck, M. E. *5623* M. alsinoides (48); *7935* M. Pulsiferae (40); *8625* M. guttatus (14), *5606* var. depauperatus (14b); *8786* M. aurantiacus (112); *8810* M. dentatus (38); *9577*, *9628* M. nanus (83); *9580* M. primuloides (54).

Peckinpah, Mrs. R. — M. floribundus var. geniculatus (44a).

Pennell, F. W. *2194*, *2279*, *2533* M. glabratus (25), *10444* var. Fremontii (25a).

Perry, R. C. — M. ringens (1).

Pierson, F. W. *195* M. brevipes (70); *197* M. nasutus (17); *198* M. guttatus (14); *199* M. Parishii (51); — M. diffusus (61).

Pilsby, H. A. — M. verbenaceus (8).

Pineo, A. J. — M. alsinoides (48).

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Explanation of Plate

PLATE 3

Fig. 1. *Mimulus Treleasei* Grant.

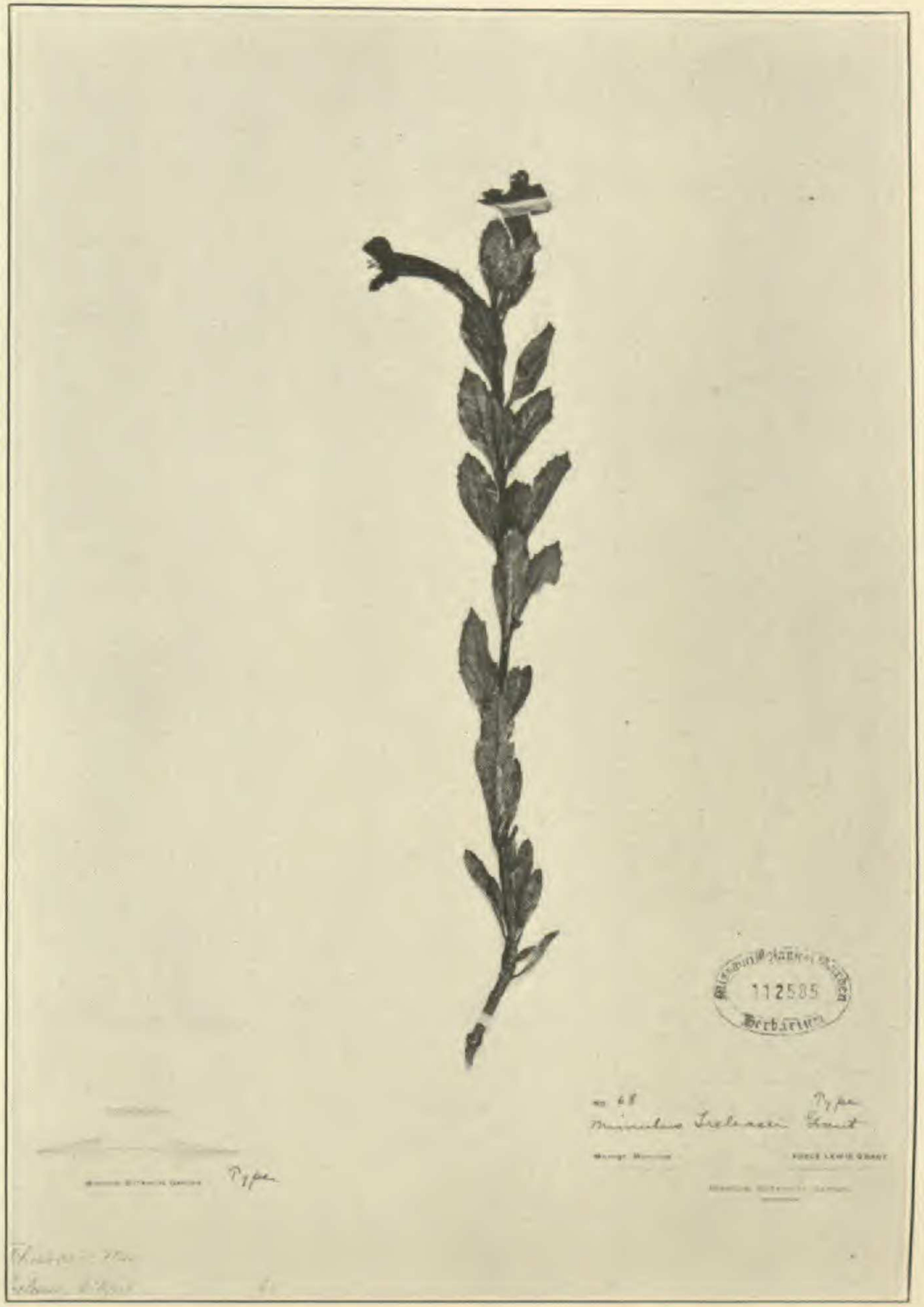
Mexico.

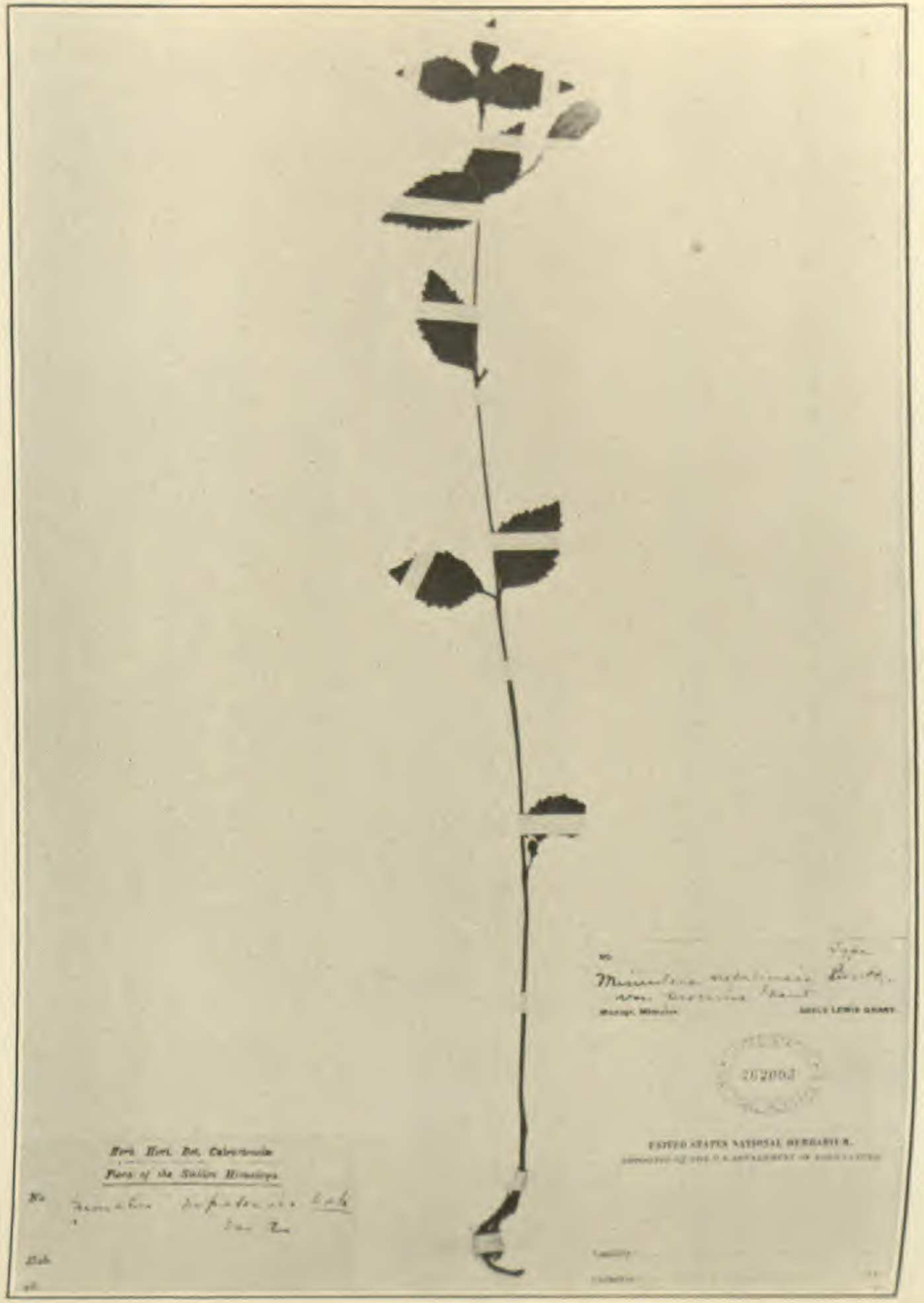
From the type specimen, Trelease No. 68, in the Herbarium of the Missouri Botanical Garden.

Fig. 2. *Mimulus nepalensis* Benth. var. *procerus* Grant.

India.

From the type specimen, Gammie, in the Herbarium of the Missouri Botanical Garden.




Type
Herb. Hort. Bot. Calcuttensis
Flora of the Sikkim Himalaya
No.
United States National Herbarium.

GRANT—A MONOGRAPH OF THE GENUS MIMULUS

Explanation of Plate

PLATE 4

Fig. 1. *Mimulus guttatus* DC. var. *decorus* Grant.

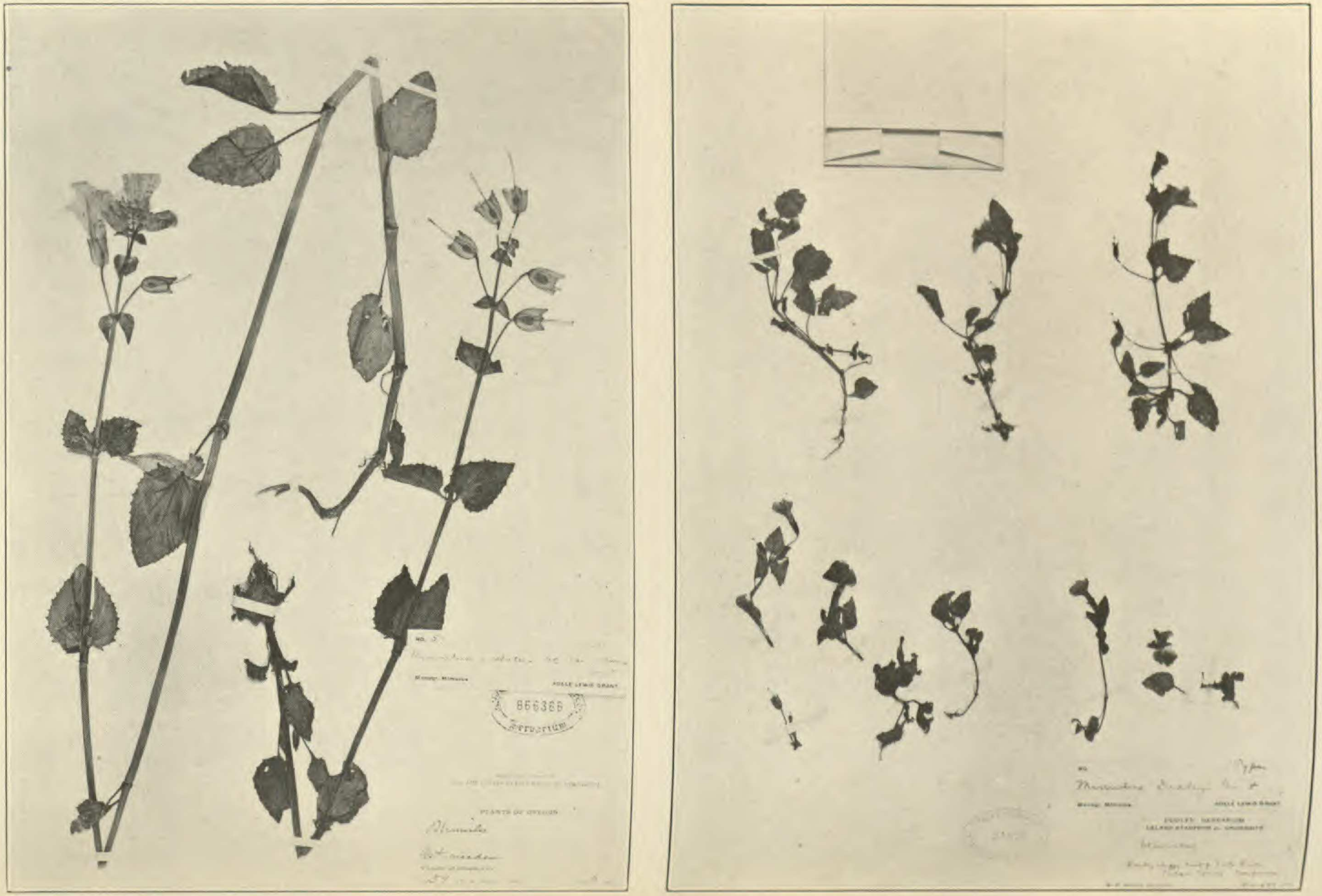
California.

From the type specimen, Lyon No. 59, in the Herbarium of the Missouri Botanical Garden.

Fig. 2. *Mimulus Dudleyi* Grant.

California.

From the type specimen, Dudley, in the Herbarium at Stanford University.



GRANT—A MONOGRAPH OF THE GENUS MIMULUS

EXPLANATION OF PLATE

PLATE 5

Fig. 1. *Mimulus diffusus* Grant.

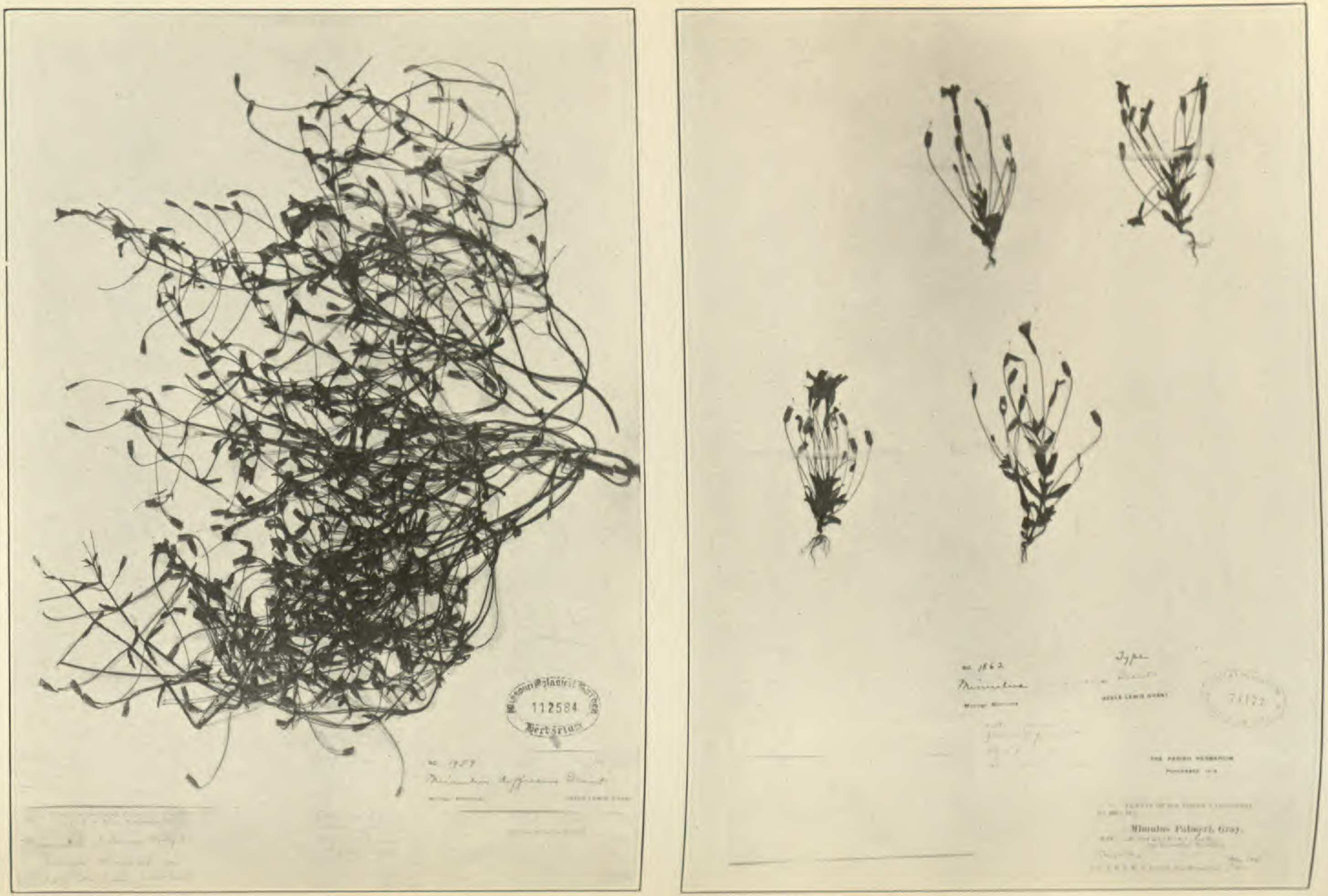
Oregon.

From the type specimen, Jepson & Hall No. 1959, in the Herbarium of the Missouri Botanical Garden.

Fig. 2. *Mimulus purpureus* Grant.

California.

From the type specimen, Parish & Parish No. 1862, in the Herbarium at Stanford University.



GRANT—A MONOGRAPH OF THE GENUS MIMULUS

Explanation of Plate

PLATE 6

Fig. 1. *Mimulus Leibergii* Grant.

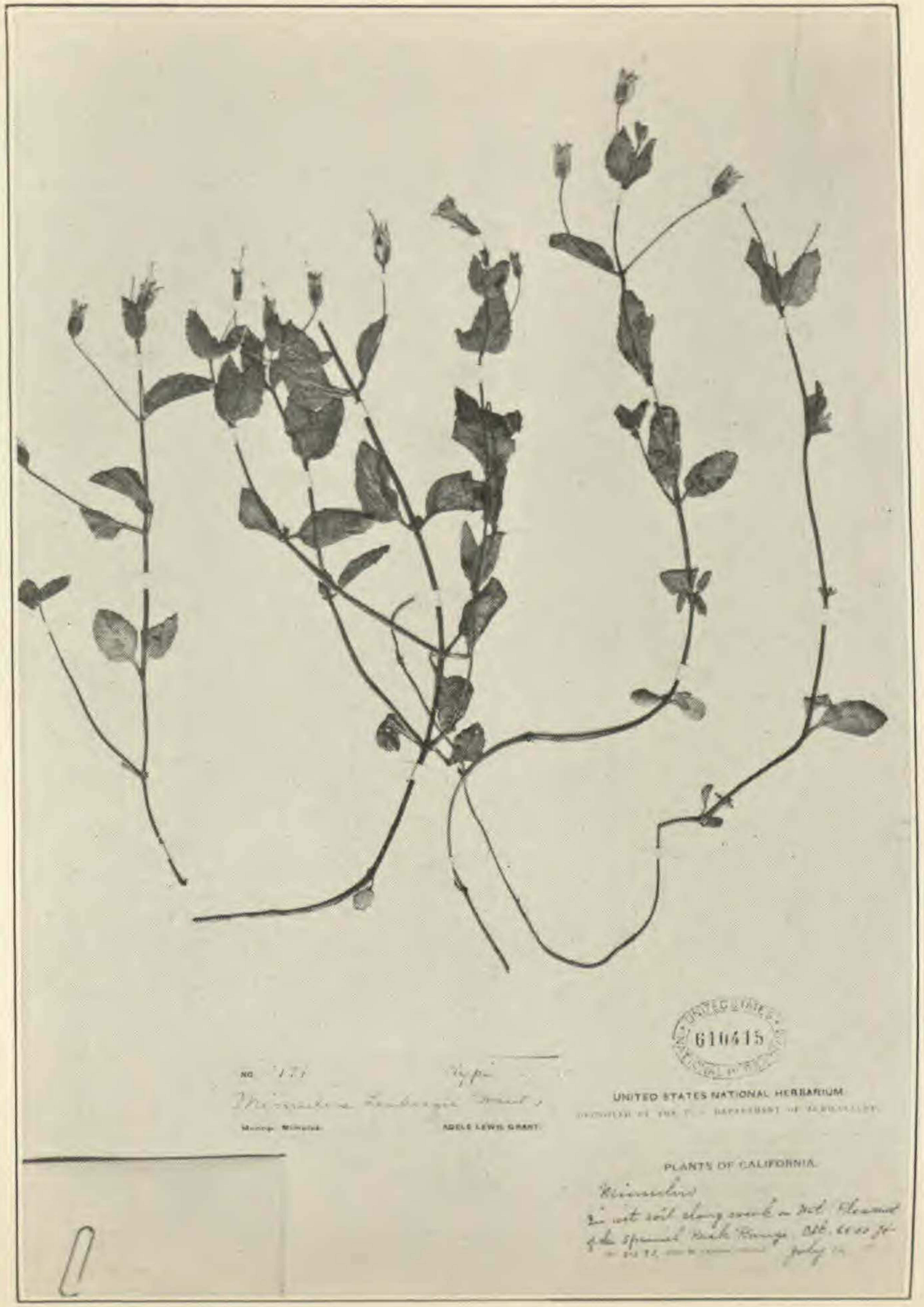
California.

From the type specimen, Leiberg No. 5171, in the United States National Herbarium.

Fig. 2. *Mimulus Grayi* Grant.

California.

From the type specimen, Congdon, in the Gray Herbarium of Harvard University.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Type
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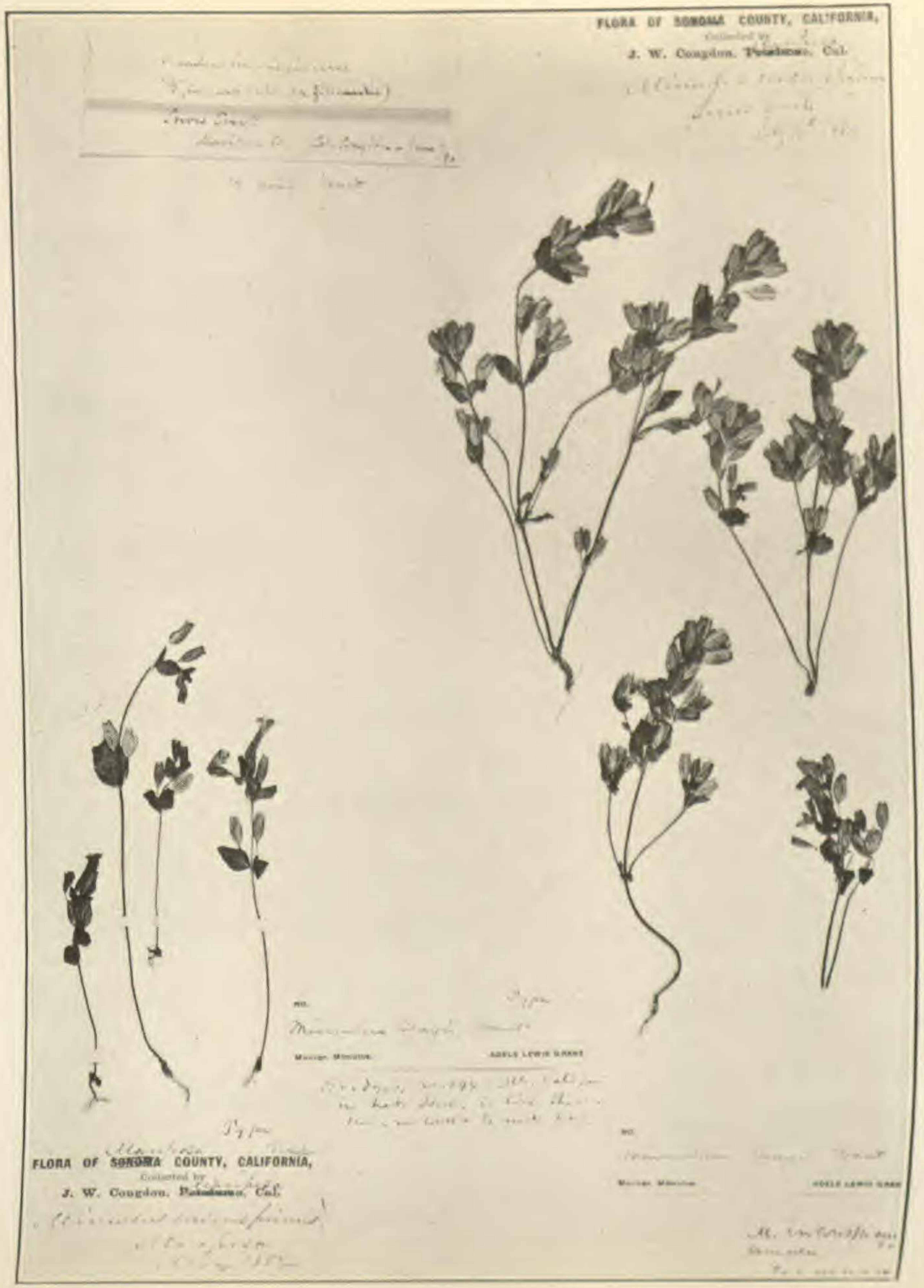
UNITED STATES NATIONAL HERBARIUM
Monogr. Mimulus
ADELE LEWIS GRANT
PLANTS OF CALIFORNIA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Collected by
J. W. Congdon. Petaluma, Cal.
NO.
Type
Monogr. Mimulus
ADELE LEWIS GRANT
Type
FLORA OF SONOMA COUNTY, CALIFORNIA,
Collected by
J. W. Congdon. Petaluma, Cal.
NO.
Monogr. Mimulus
ADELE LEWIS GRANT

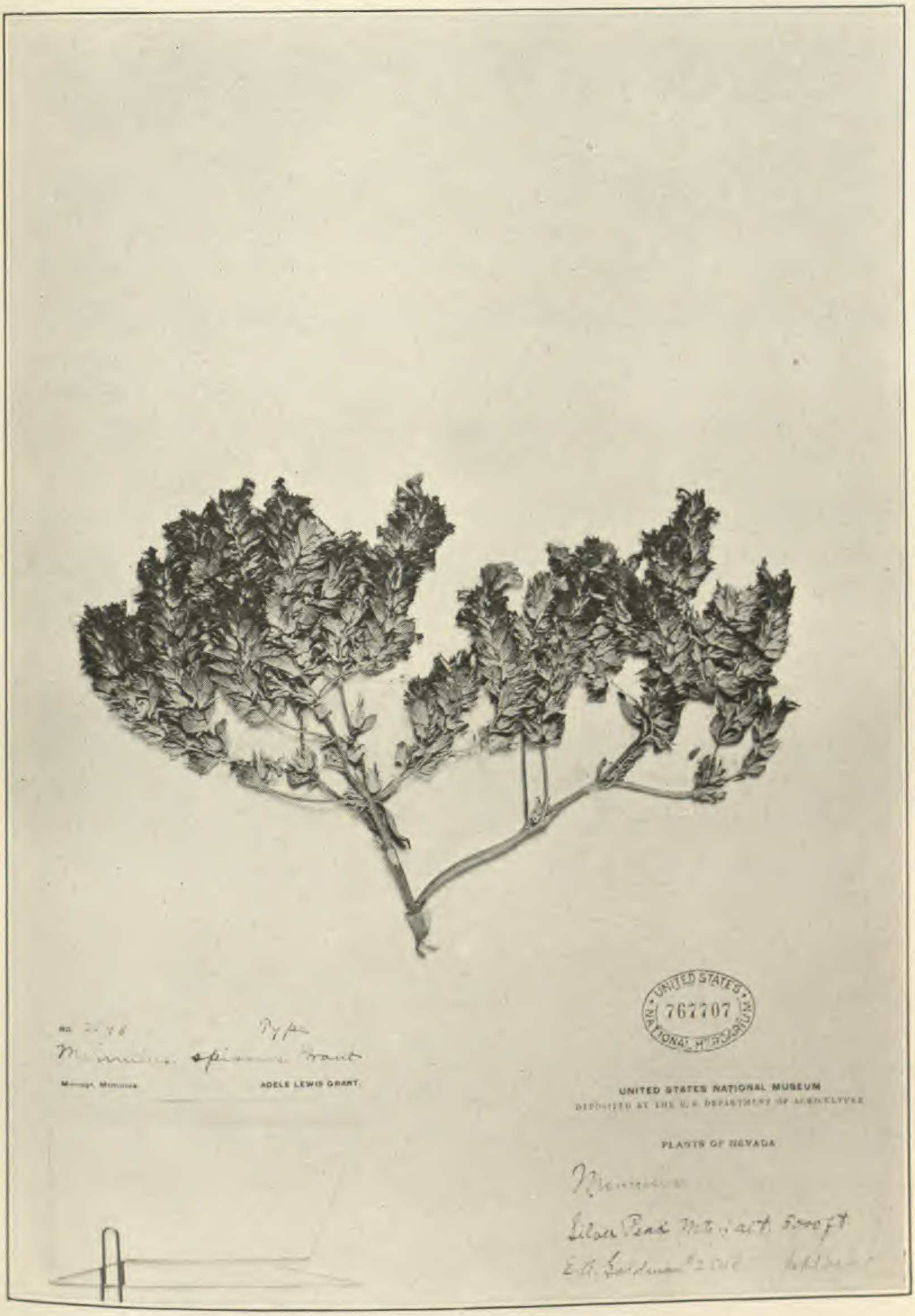
Explanation of Plate

PLATE 7

Mimulus spissus Grant.

Nevada.

From the type specimen, Goldman No. 2548, in the United States National Herbarium.


Type
ADELE LEWIS GRANT
UNITED STATES NATIONAL HERBARIUM
767707
UNITED STATES NATIONAL MUSEUM
PLANTS OF NEVADA
Mimulus
Silver Peak Mts., alt. 8000 ft
E. A. Goldman 2010

GRANT—A MONOGRAPH OF THE GENUS MIMULUS

Explanation of Plate

PLATE 8

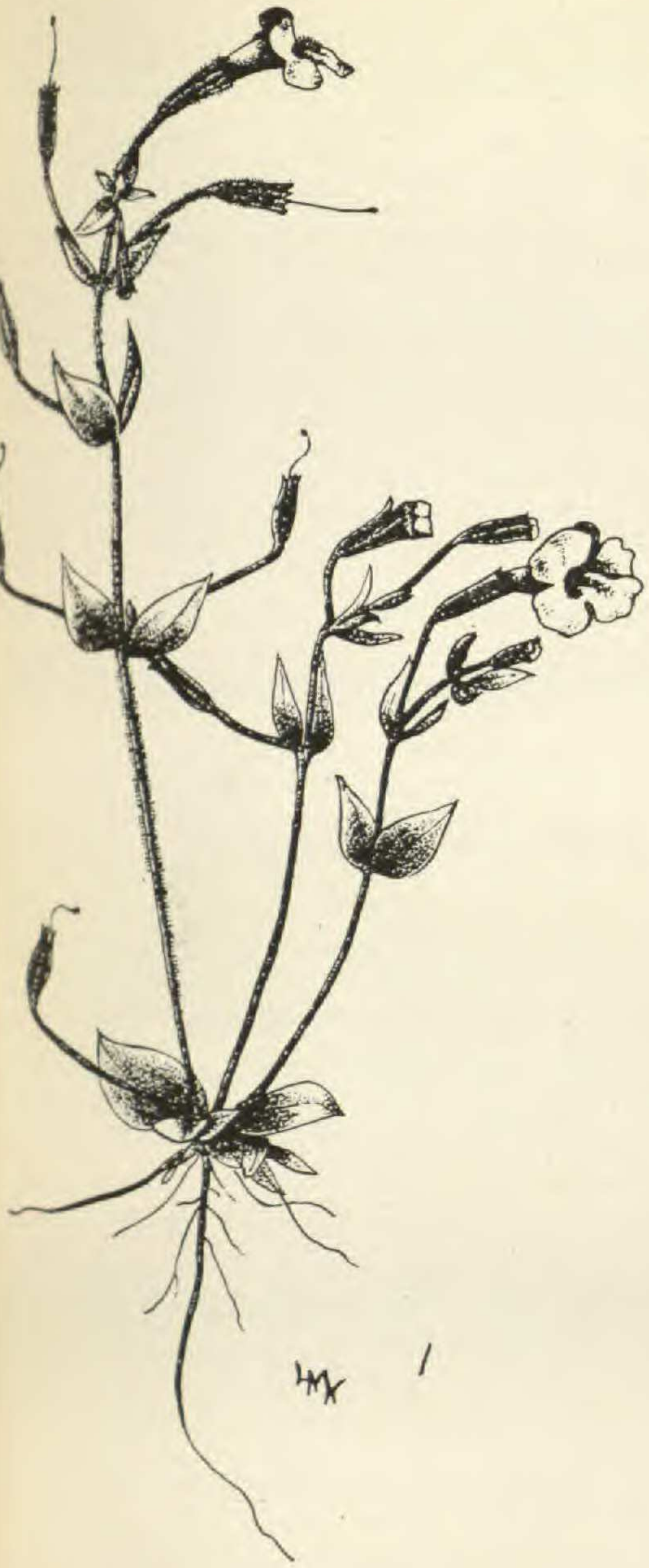
Fig. 1. *Mimulus arenarius* Grant; habit sketch of one of the plants in the type collection, × 1.

Fig. 2. *Mimulus Lewisii* Pursh; habit, × 1.

Fig. 3. *Mimulus primuloides* Benth.; habit, × 1.

Fig. 4. *Mimulus guttatus* DC.; habit, × 1.

del. Dr. L. M. Newlon



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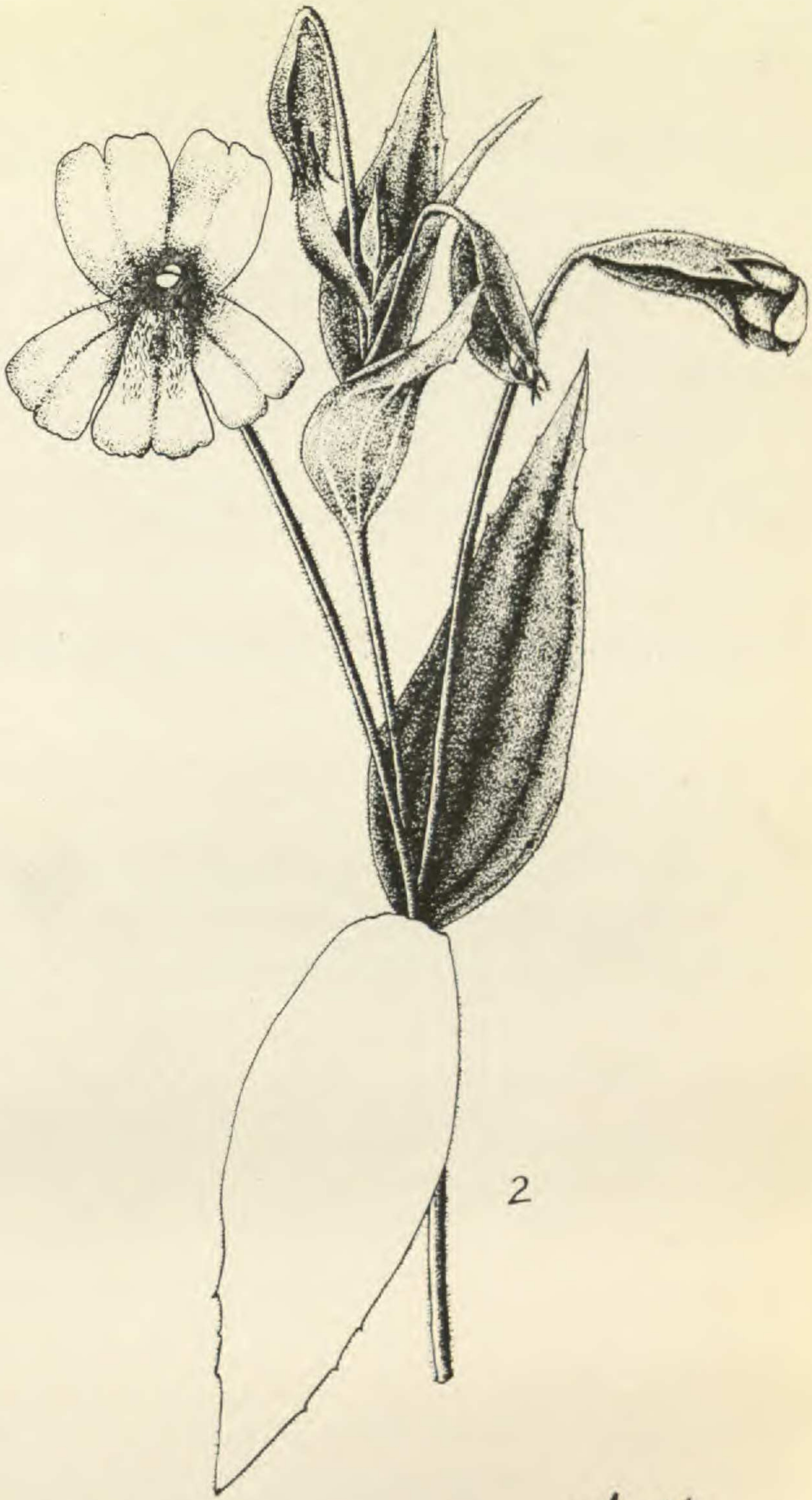

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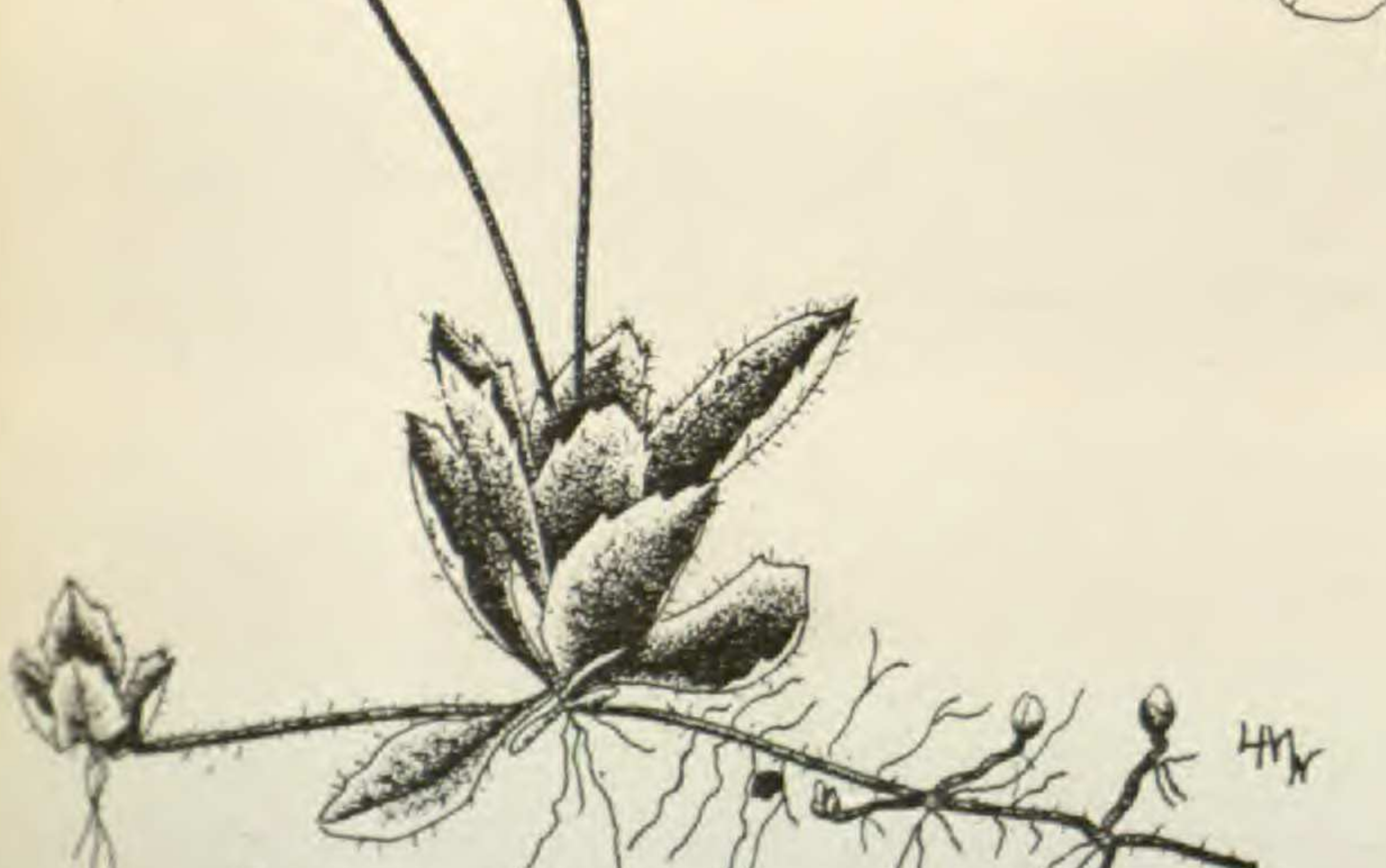

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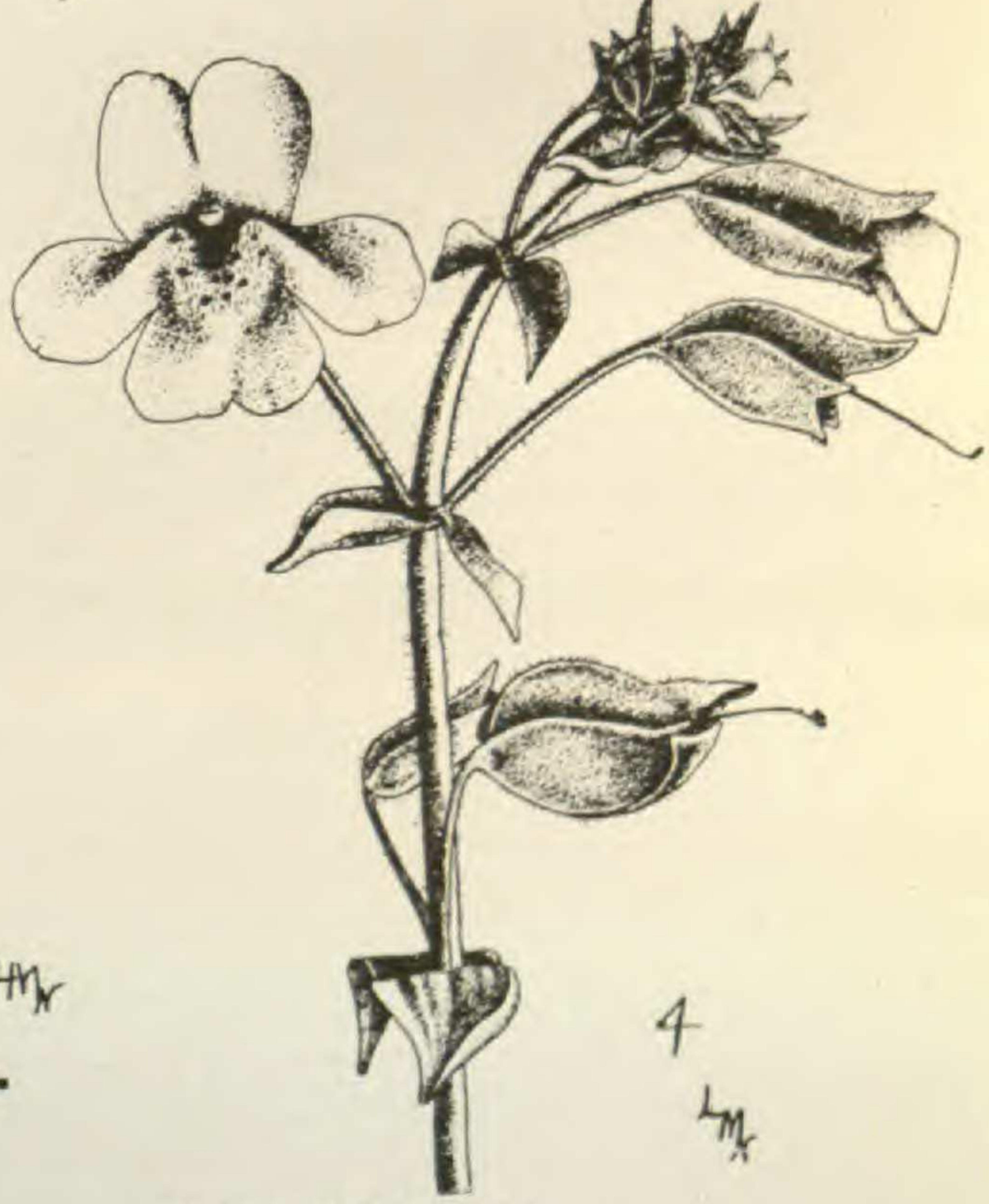


4

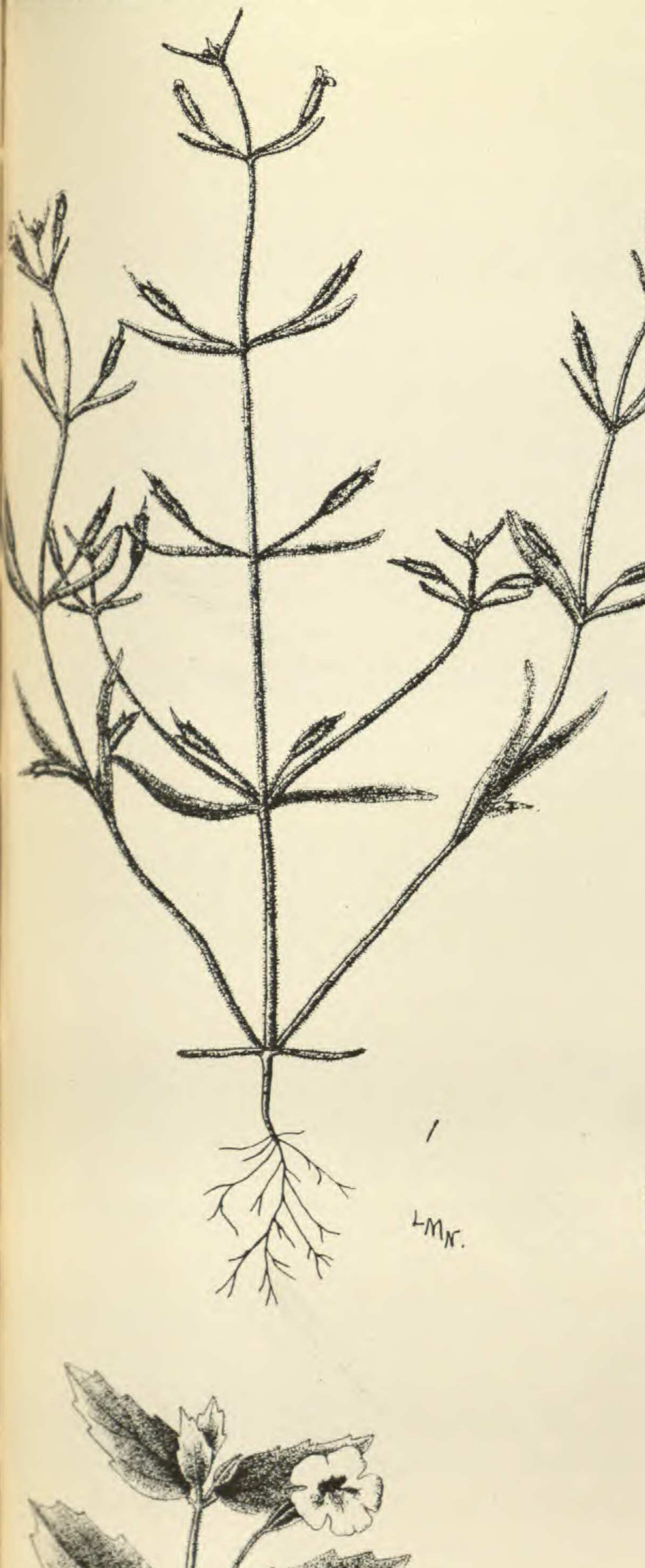
GRANT—A MONOGRAPH OF THE GENUS MIMULUS

EXPLANATION OF PLATE

PLATE 9

Fig. 1. *Mimulus Breweri* (Greene) Coville; habit, × 1.
Fig. 2. *Mimulus Tilingi* Regel var. *corallinus* (Greene) Grant; habit, × 1.
Fig. 3. *Mimulus moschatus* Dougl. var. *longiflorus* Gray; habit, × 1.
Fig. 4. *Mimulus Layneae* (Greene) Jepson; habit, × 1.

del. Dr. L. M. Newlon



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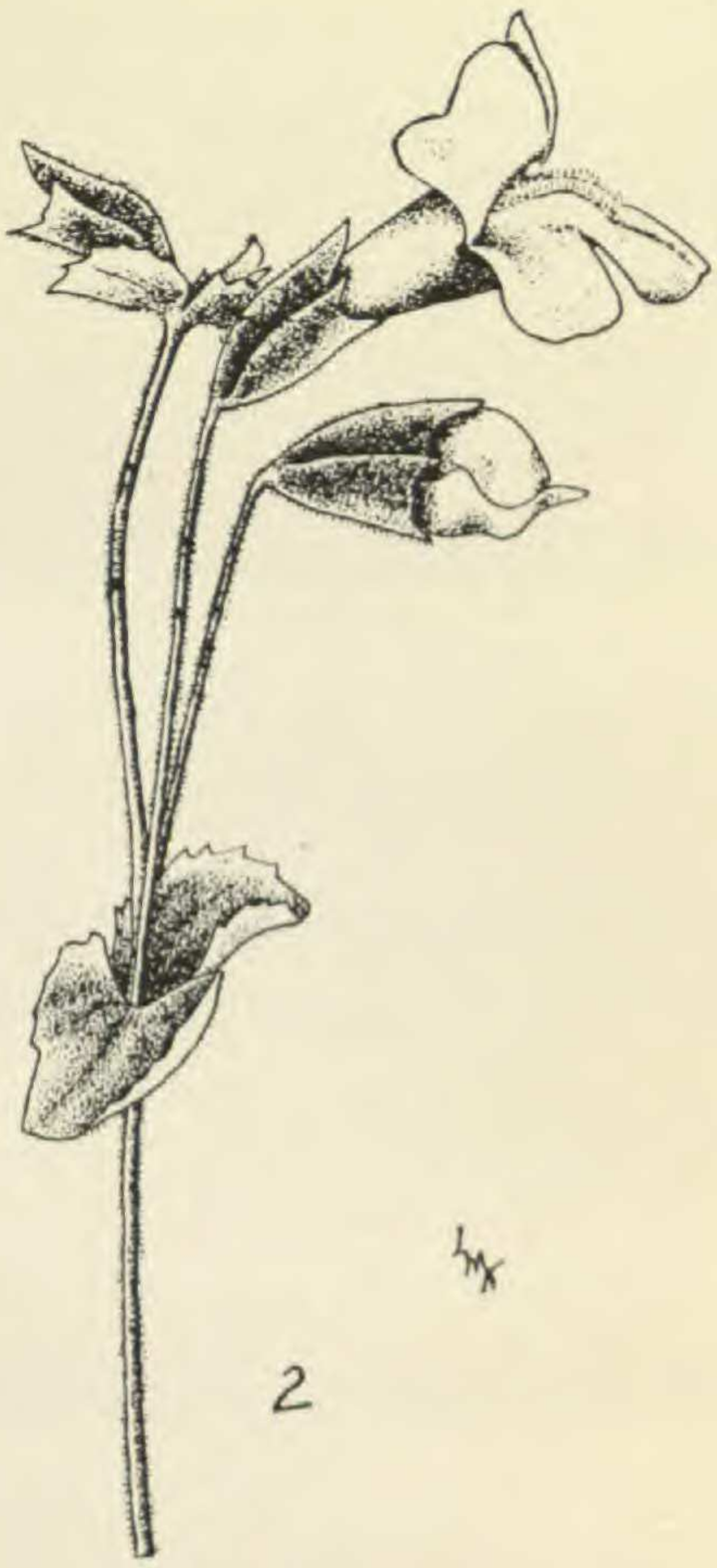

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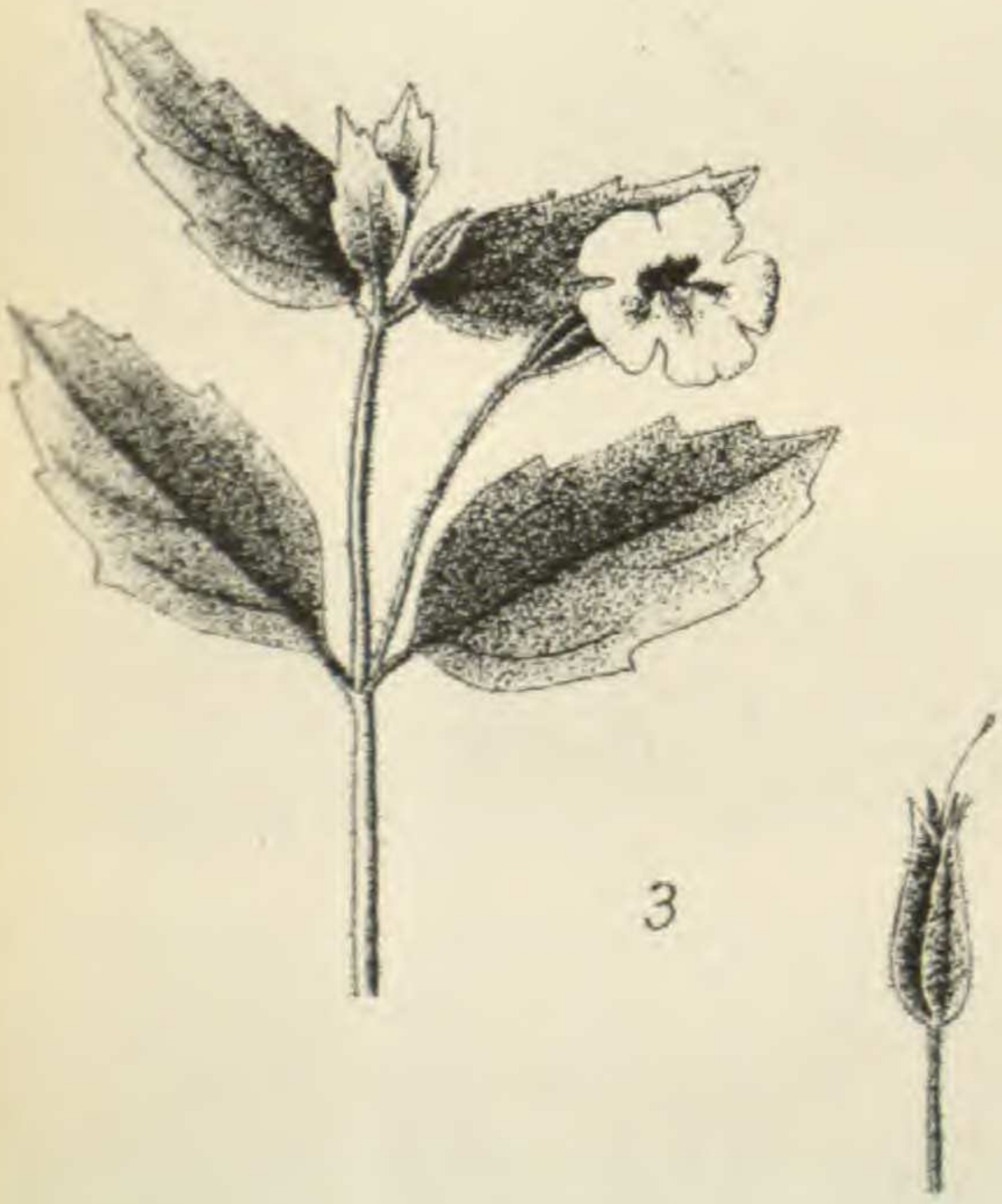

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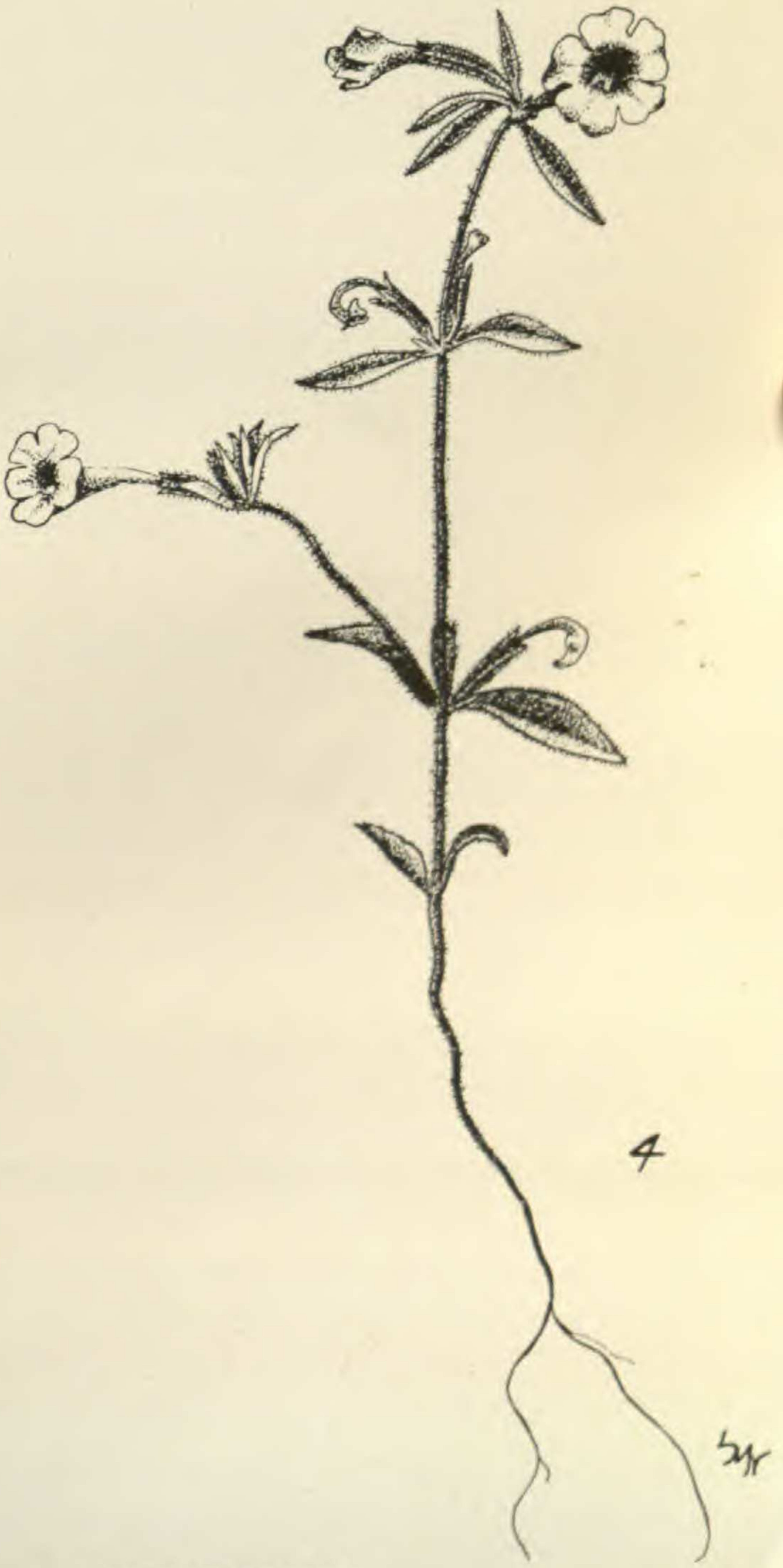

4

EXPLANATION OF PLATE

PLATE 10

Fig. 1. *M. nasutus* Greene, mature capsule, × 1.
Fig. 2. *M. longiflorus* (Nutt.) Grant, flower, × 1.
Fig. 3. *M. Kelloggii* Curran, opened flower, × 2.
Fig. 4. *M. bicolor* Benth., mature calyx, showing the corky ribs, × 1.
Fig. 5. *M. aurantiacus* Curt., cross-section of ovary, × 6.
Fig. 6. *M. Kelloggii* Curran, mature capsule, × 2.
Fig. 7. *M. guttatus* DC. var. *arvensis* (Greene) Grant, mature calyx, × 1.
Fig. 8. *M. guttatus* DC. var. *arvensis* (Greene) Grant, mature ovary, × 4.
Fig. 9. *M. guttatus* DC. var. *arvensis* (Greene) Grant, cross-section of ovary, × 6.
Fig. 10. *M. Pulsiferae* Gray, habit sketch showing the mature calyces and pedicels, × 1.
Fig. 11. *M. puniceus* (Nutt.) Steud., flower, × 1.
Fig. 12. *M. tricolor* Lindl., mature capsule, × 2.
Fig. 13. *M. mohavensis* Lemmon, opened flower, × 2.
Fig. 14. *M. aurantiacus* Curt., flower, × 1.
Fig. 15. *M. tricolor* Lindl., cross-section of ovary, × 6.
Fig. 16. *M. Torreyi* Gray, cross-section of ovary, × 24.
Fig. 17. *M. subsecundus* Gray, mature calyx, × 1.

del. Miss Joyce Saunders

GRANT—A MONOGRAPH OF THE GENUS MIMULUS